FOYNES ISLAND MARINE SITE INVESTIGATION

ASSESSMENTS OF IMPACTS OF THE MARITIME USAGE REPORT (AIMU)

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1 INTRODUCTION

Shannon Foynes Port Company (SFPC) appointed RPS to prepare the Maritime Usage Area License application for the Marine Site Investigation (SI) to support the planning and preliminary engineering design of the Foynes Deep Water Berth Development on Foynes Island and access bridge from Foynes Port to the south-east corner of Foynes Island.

This Assessments of Impacts of the Maritime Usage report (AIMU) is being submitted as part of the Maritime Area Usage Licence application process.

1.1 Overview of the Proposed Development and Marine Site Investigation Works

1.1.1 Project Context

The proposed activity / works involves a Marine SI to support the planning and preliminary engineering design of the Foynes Deep Water Berth Development on Foynes Island. The proposed Deep Water Berth Development is a fundamental part of Shannon Foynes Port Company's plan for delivering offshore renewable energy, as outlined in the Vision 2041 Strategic Review 2022.

It is intended to perform both geophysical and geotechnical marine-based SI to inform the design of the proposed bridge crossing over to the south-east corner of Foynes Island from Foynes Port, construction of an access road across the island, construction of a quay / marine infrastructure with associated quay furniture / services and development of a hardstanding hinterland area at the north-west edge of the island.

The surveys will entail the following activities:

- Standard methods of non-invasive acoustic based sensing (including gathering of bathymetric, side scan sonar, sub-bottom profiler and magnetometer data);
- Standard methods of geotechnical investigation including deep boreholes, shallow boreholes and shallow cone penetration tests (CPTs);
- Environment Sampling including surface grab sampling by box corer for chemistry analysis and surface scrapes (intertidal) and grab sample (subtidal) for granulometric and Loss on Ignition analyses
- Operation and manoeuvring of typical jack-up barge, survey vessels and floating pontoon equipment.

1.1.2 The Applicant

The applicant for the Maritime Usage Area License is SFPC. SFPC is responsible for the operation of Ireland's deepest sheltered commercial harbour and has jurisdiction over all marine activities on a 500km^2 area on the Shannon Estuary, stretching from Kerry to Loop Head to Limerick City.

The turnover value of current trade handled by the port is €8.5 billion per annum, with associated economic benefits of €1.9 billion per annum supporting over 3,900 jobs. AIM

SFPC operates one of the deepest ports in Europe, with depths of up to 32m and handling capacity for large vessels up to 200,000 deadweight tonnes.

SFPC is also an EU Core Network Port (TEN-T) and a Tier 1 Port in the Irish National Ports Policy.

In order to fully realise the potential of its deep-water advantage, future expansion and development of the port is guided by its Masterplan, Vision 2041, which is the driving force behind the port expansion to Foynes Island and hence the Marine SI.

1.2 Format of the Assessments of Impacts of the Maritime Usage Report

1.2.1 Purpose of Report

The purpose of this Assessments of Impacts of the Maritime Usage (AIMU) report is to provide responsible authorities with objective information on which to assess the environmental effects of the proposed activity / works on the receiving environment, in accordance with the Maritime Area Planning Act 2021. This AIMU report is part of the Maritime Usage Area License Application and documents the current state of the environment in the vicinity of the activity / works in an effort to quantify the effects of said activity / works on the environment, and to highlight how mitigation will be implemented to minimise these impacts.

1.2.2 Report Structure

This AIMU report uses the grouped structure method to describe the existing environment, the potential impacts of the proposed activity/works thereon and the proposed mitigation measures. Potential impacts are identified, assessed, and mitigated under the following topic chapters:

- Biodiversity
- Land, Soils, Geology & Hydrogeology
- Water
- Air, Climate & Noise
- Landscape & Visual
- Archaeology & Cultural Heritage
- Material Assets (Traffic & Transport and Coastal Processes)
- Shipping & Navigation
- Major Accidents & Disasters

Chapter **Error! Reference source not found.** of this report sets out the Background to the Proposed Works, including the relevant policy. Chapter 3 provides a Description of the Proposed Works.

1.2.3 Assessment of Environmental Impacts

The assessment of the effects of the project is premised upon an understanding of the likely magnitude of predicted impacts and the sensitivity to change of affected receptors. This provides for a determination of the likely significance of effects.

The baseline scenario relating to each environmental factor is used to identify potential receptors. The sensitivity of a given receptor is dependent on the receptor concerned, and the effect to which it is subject. For this reason, the sensitivity considers:

- The vulnerability of the receptor;
- The capacity of the receptor to recover; and
- The value/importance of the receptor.

An impact is defined as a physical change to the environment which is attributable to the implementation of the project. The magnitude of impacts generally takes into account factors such as:

- The extent of the impact;
- The duration of the impact;
- The frequency of the impact; and
- The capacity for the impact to be reversed.

The significance of an effect, defined in terms of the express consequence of an impact, is determined with regard to the magnitude of the impact and the sensitivity or value of the receptor. Table 1.1 provides an indication of the general categorisation of the scale of significance.

Table 1.1: Assessment of significance matrix

Sensitivity	Magnitude of Impact			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
Low	Negligible or minor	Negligible or minor	Minor	Minor or moderate
Medium	Negligible or minor	Minor	Moderate	Moderate or major
High	Minor	Minor or Moderate	Moderate or major	Major

Effects are also considered, and categorised, in terms of being direct and indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, and positive and negative, as appropriate.

2 PROJECT DESCRIPTION

2.1 Introduction

This section of the AIMU report provides a description of the proposed works, including methodologies and environmental controls.

As presented in Chapter 1 of this report, the proposed activity / works involves a Marine SI to support the planning and preliminary engineering design of the Foynes Deep Water Berth Development on Foynes Island. The proposed Deep Water Berth Development is a fundamental part of Shannon Estuary's plan for delivering Offshore Renewable Energy, as outlines in the Vision 2041 Strategic Review 2022.

2.2 Site Location

The proposed Marine SI works are being carried out to support the planning and preliminary engineering design of the Foynes Deep Water Berth Development on Foynes Island. Foynes Port is located in south-western Ireland in County Limerick. The Port lies on the south bank of the Shannon Estuary, approximately 30km downstream of the city of Limerick. Foynes Island is located approximately 500m north of Foynes Port in the Shannon Estuary. Figure 2.2 shows the location of Foynes Port and Foynes Island.

2.3 Proposed Works

The Propose Marine SI will take place in the Maritime Usage Area as shown in Figure 2.2. The various stages for the Marine SI works are outlined in the subsections below in the sequence that they will be undertaken.

2.3.1 Marine Geophysical Survey

A marine geophysical survey will be carried out and will cover the full area of the development footprint under water (where accessible). The aims of the survey are to:

- Identify and map potential geohazards;
- Identify and map potential archaeological sites and features;
- Facilitate the development of a ground model in support of the wider design; and
- Provide data and information in support of Environmental Impact Assessment.

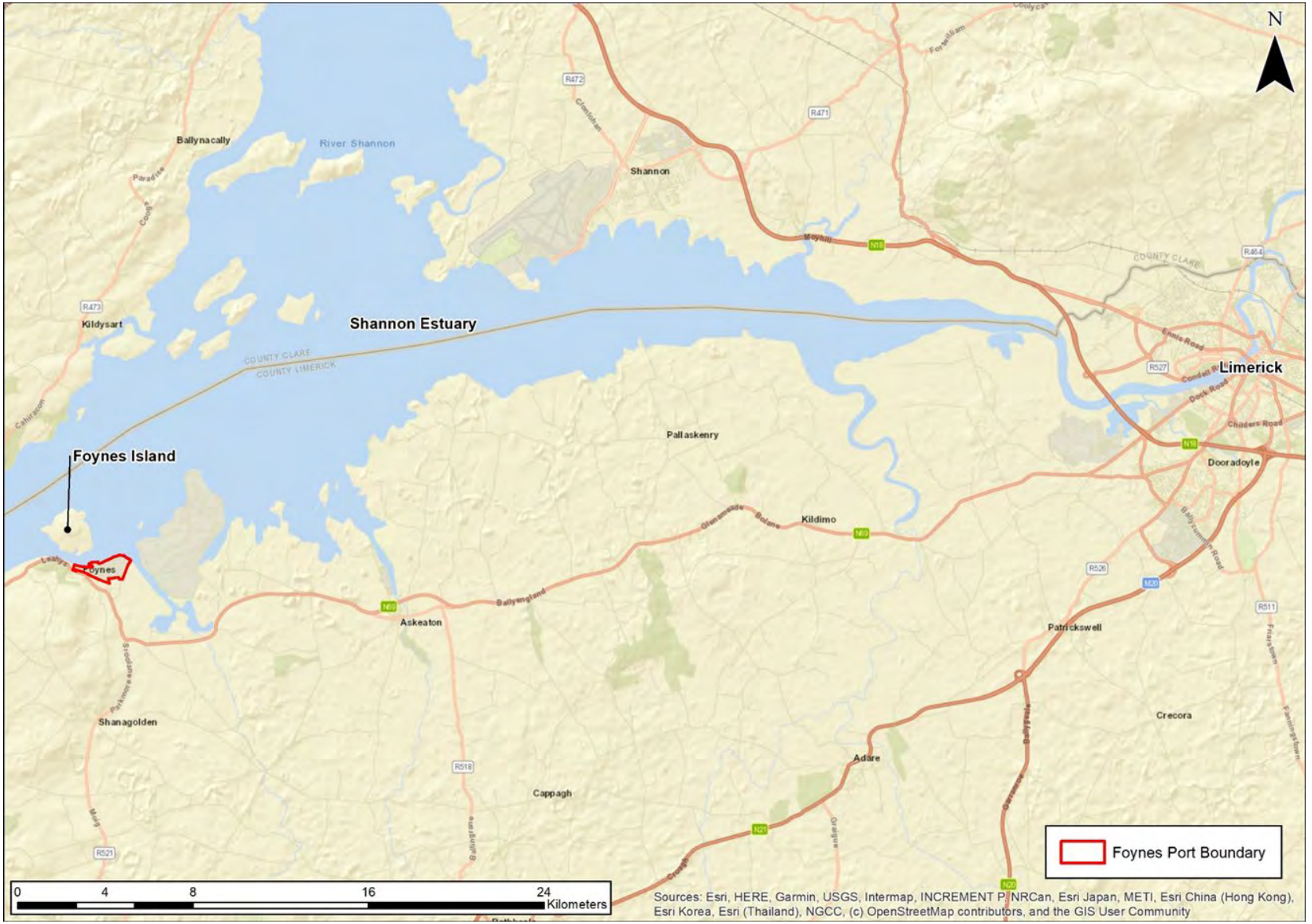

Figure 2.1: Foynes Port Location Map

Figure 2.2: Maritime Usage Licence Areas for Marine SI

A range of instruments will be deployed for this survey including:

- GNSS positioning;
- Motion Reference Unit;
- Multibeam Echosounder;
- Sound Velocity Profiler;
- Sub-bottom Profiler, chirp;
- Side-scan Sonar, dual frequency, low and high;
- Magnetometer, caesium;
- Navigation, acquisition and processing suite;
- Post-processing navigation suite; and
- Charting software.

The survey will be undertaken by a competent and experienced marine hydrographer and will use a Department of Marine licenced survey vessel capable of accessing all survey areas at high water.

2.3.1.1 Side Scan Sonar Survey

Method: Vessel towing a submerged pod (Sonar Device).

Vessel: Dept of Marine licensed survey vessel capable of accessing all project areas at High Water

Main Lines - 20 metre spacing in shallow water and no more than 50 metres in deeper water

Cross Lines – 200 metre spacing

Additional infill lines in shallow areas to allow for full device-suite coverage at 100% and greater; no data gaps. Swathe width to achieve 25% overlap with neighbouring lines

Location: As shown on Site Layout Map 1, M0845-RPS-FS-XX-DR-C-0201; and Site Layout Map 2, M0845-RPS-FS-XX-DR-C-0202 of the application drawings.

A review of anticipated water depths will be carried out in advance to ensure that the above requirements may be met.

2.3.1.2 Sub-Bottom Profiling Survey

Method: Vessel towing a submerged pod (Pinger).

Vessel: Dept of Marine licensed survey vessel capable of accessing all project areas at High Water.

Main Lines - 20 metre spacing in shallow water and no more than 50 metres in deeper water.

Cross Lines – 200 metre spacing.

Additional infill lines in shallow areas to allow for full device-suite coverage at 100% and greater; no data gaps. Swathe width to achieve 25% overlap with neighbouring lines.

Location: As shown on Site Layout Map 1, Drg Nr., M0845-RPS-FS-XX-DR-C-0201; and Site Layout Map 2, Drg Nr., M0845-RPS-FS-XX-DR-C-0202 of the application drawings.

A review of anticipated water depths will be carried out in advance to ensure that the above requirements may be met.

2.3.1.3 Magnetometer Survey

Method: Vessel towing a submerged pod (Magnetometer).

Vessel: Dept of Marine licensed survey vessel capable of accessing all project areas at High Water.

Main Lines - 20 metre spacing in shallow water and no more than 50 metres in deeper water.

Cross Lines – 200 metre spacing.

Additional infill lines in shallow areas to allow for full device-suite coverage at 100% and greater; no data gaps. Swathe width to achieve 25% overlap with neighbouring lines.

Location: As shown on Site Layout Map 1, Drg Nr., M0845-RPS-FS-XX-DR-C-0201; and Site Layout Map 2, Drg Nr., M0845-RPS-FS-XX-DR-C-0202 of the application drawings.

A review of anticipated water depths will be carried out in advance to ensure that the above requirements may be met.

2.3.2 Geotechnical and Sediment Sampling

2.3.2.1 Piled Quay and Reclamation Area Boreholes

The geotechnical and sediment sampling comprises two phases.

Phase 1 involves:

- Area A – drilling of 71 boreholes
- Area B – drilling of 8 boreholes

Phase 1 boreholes will be circa 25m deep, or 5m into competent rock (whichever occurs first). These boreholes will have a diameter of 225mm.

Area A Location: Points as shown on Site Layout Map 1, M0845-RPS-FS-XX-DR-C-0201 of the application drawings. Locations shown are indicative only, locations may vary.

Phase 2 involves:

- Area A – drilling of 62 boreholes
- Area B – drilling of 22 boreholes

Phase 2 boreholes will be circa 30m deep, or 10m into competent rock (whichever occurs first). These boreholes will have a diameter of 225mm. Figure 2.3 shows the proposed locations for the boreholes within the foreshore licence area.

Area B Location: Points as shown on Site Layout Map 2, Drg Nr., M0845-RPS-FS-XX-DR-C-0202 of the application drawings. Locations shown are indicative only, locations may vary.

The boreholes are to be drilled firstly using cable percussive techniques. If rock is to be penetrated, then rotary drilling will follow on. The machinery to be used is approximately 2m tall when it is in transit and approximately 7m tall when the borehole is being driven. The machinery will be supported by a suitable jack-up barge. The typical arrangement will be similar to that shown in the photo below.

For each borehole the footprint of the works on the foreshore will be four approximately $1m^2$ legs of the jackup barge and the 200mm (8") temporary steel casing. The 200mm steel casing is the diameter of the borehole.

There will be no permanent structures, all site investigation will be facilitated by temporary works. The moving marine plant will remain on site for the duration of the works.

Figure 2.3: Phase 1 and Phase 2 Borehole Locations within Maritime Usage Areas

2.3.2.2 Surface grab sample

It is proposed to collect surface grab samples from 16 locations (AREA A) within the immediate footprint of the proposed development. It is expected that 12 of these sample locations will occur in the subtidal area, and 4 locations in the intertidal area. In addition, a subtidal reef habitat has been identified along the centre of the main Shannon channel which is immediately adjacent to the development. It is expected that 10 drop down video locations will be surveyed within and adjacent to this reef community. A walkover survey will be undertaken on the hard-benthos intertidal areas within and immediately adjacent to the footprint of the hardstand area.

It is proposed to collect benthic faunal samples from 8 locations (AREA B) within the vicinity of the proposed bridge location. It is expected that 5 of these sample locations will occur in the subtidal area and 3 will occur in the intertidal area at the southern landfall point of the bridge. A walkover survey will be undertaken along the hard-benthos intertidal areas at both landfall locations of the bridge.

Subtidal sampling will involve the following:

- Single 0.1m^2 grab samples collected at each of the subtidal sampling stations;
- An additional grab will be collected for Grainsize and Loss on Ignition;
- Ancillary information will be recorded on pre-prepared data record sheets;

- Samples will be positioned using the vessel's GPS. Sample positions will be recorded when on site;
- Photographs will be taken of each sample; and
- Drop down video footage will be collected from circa 5-10 locations within and adjacent to an extensive reef area located within Lower Shannon SAC.

Intertidal sampling will include the following:

- Single stove-pipe core (0.028m^2) will be collected at each intertidal sample station;
- A surface scrape will be collected at each site;
- Ancillary information will be recorded on pre-prepared data record sheets;
- Samples will be positioned using a hand-held GPS. Sample positions will be recorded when on site; and
- Photographs of the site will be collected at each location.

Figure 2.4 shows the locations for the surface grab samples within the foreshore licence area.

2.3.3 Environmental Sampling

It is proposed that 1 surface scrape at each intertidal sampling station and 1 additional grab sample at each subtidal sampling station will be taken.

Location: Points as per surface grab samples under item 2b shown on Site Layout Map 1, Drg Nr. M0845-RPS-FS-XX-DR-C-0201 and Site Layout Map 2, M0845-RPS-FS-XX-DR-C-0202 of the application drawings. Locations shown are indicative only, locations may vary.

2.3.4 Anticipated Plant

Typical plant would be as outlined below, but the choice of plant will ultimately be determined by the SI Contractor and their proposed methodology. The following plant is likely to be required:

- Jack-up barge
- Tug & workboat
- Department of Marine licensed survey vessel capable of accessing all project areas at High Water.

Figure 2.4: Surface Grab Sample Locations within Maritime Usage Area

3 NEED AND ALTERNATIVES

3.1 Introduction

The proposed activity/works (Maritime Usage) involve a Marine Site Investigation to support the preliminary and detailed engineering design of the Deep-Water Terminal Development on Foynes Island. A brief description of the proposed Deep Water Terminal development is provided below.

3.2 Main Deepwater Terminal Development

SFPC wish to progress the construction of a new Deepwater Berth Development at Foynes Island. The proposed development will be Irelands deepest port facility with unrivalled water depths of -18m CD at the quay. The development will be used to support the offshore renewable energy industry and provide additional deep-water berthing for commercial shipping.

The proposed new deepwater berth development will be located on the western side of Foynes Island and the development includes the construction of a new road from the deepwater berth to the south-eastern side of the island where a new bridge will connect the Island with the mainland at the existing Foynes Port. The project is intended to provide deep water port facilities to facilitate the construction, assembly, and operations & maintenance of offshore renewable energy projects and provide additional commercial facilities for SFPC.

3.3 Marine Site Investigation

It is intended to perform both geophysical and geotechnical marine-based site investigation (as outlined in Section 2.3). The main need for these proposed works is to inform the consideration of alternative options for the main project including alternative alignments, locations and designs for the proposed bridge crossing over to the South-East corner of Foynes Island from Foynes Port, construction of an access road across the island, construction of quay/marine infrastructure with associated quay furniture/services and development of a hardstanding hinterland area at the North-West edge of the Island.

In terms of alternatives the Marine SI works are being undertaken using industry standard best practice and across an area which is under consideration for the design of the main project. There are no other alternative options for the Marine SI, the nature of both the geophysical and geotechnical investigations, as proposed, are necessary for the appropriate technical, environmental, economic and social assessment of the Main Project.

4 LEGISLATIVE CONTEXT

4.1 Marine Area Planning Act

The Maritime Area Planning Act establishes a new planning system for Ireland's maritime area, underpinned by a statutory Marine Planning Policy Statement and guided by the National Marine Planning Framework.

The application is for a Maritime Usage Area License pursuant to Part 5 (sections 110 to 133) of the Maritime Area Planning Act 2021 (MAPA). The Minister may grant a Maritime Usage Area Licence, in the opinion of the Minister, it is in the public interest to do so, subject to the provisions of the Act.

The MARA cannot issue a licence to a maritime usage for which an Environmental Impact Assessment (EIA) is required. If an EIA is required, an applicant must apply for a MAC.

4.2 Environmental Impact Assessment Directive

Once an application has been validated and formally accepted by MARA, MARA's Technical Unit will consider if it is necessary to screen it for EIA under Section 117 subsection 5a of the MAPA, 2021, having regard to Schedules 5 and 7 of the Planning and Development Regulations 2001.

Section 117 subsection 5a of the MAPA, 2021 provides that an EIA shall be carried out where the proposed development would be of a class specified in (I) Part 1 of Schedule 5 of the Planning and Development Regulations 2001, as amended, and would be above-threshold where a threshold is applicable, or would be of a class specified in (II) Part 2 of Schedule 5 of the Regulations and either no threshold is applicable or the proposed development would be above-threshold. Section 117 subsection 5a of the MAPA, 2021 provides that an EIA may be required to be carried out for projects in Part 2 of Schedule 5 which are below the specified threshold. Screening for EIA must be carried out of below threshold projects as a minimum, and where, following screening, MARA determines that the project would be likely to have significant effects on the environment, the application for Marine Usage Licence will be returned to the applicant, as a licence cannot be granted for a maritime usage to which an EIA applies. An EIA shall be carried out and the applicant must apply for a MAC.

Therefore, the obligation is to ensure that a project is subject to EIA where it is likely to have a significant effect on the environment must be understood by reference to the classes of project specified in Schedule 5 of the Planning and Development Regulations. EIA and screening for EIA are not required for every project type. As is clear from Articles 2 and 4 of the EIA Directive 2011/92/EU as amended by Directive 2014/52/EU, the requirements of the Directive apply only to the projects specified in Annex I and Annex II of the Directive and Schedule 5 of the Planning and Development Regulations, 2001, as amended.

It is clear, therefore, that unless MARA determines that the proposed Marine SI comes within a specified class of project in Annex I or II of the EIA Directive or Parts 1 or 2 of Schedule 5 of the 2001 Regulations, there is no requirement to carry out screening for EIA or EIA of the proposed development.

4.3 Water Framework Directive

Directive 2000/60/EC establishing a framework for community action in the field of water policy (the Water Framework Directive), and transposing regulations, establishes a legal framework for the protection, improvement and sustainable management of rivers, lakes, transitional waters (estuaries), coastal waters (to a distance of one nautical mile) and groundwater.

The fundamental objectives of the WFD are to maintain "high status" of surface waters where it exists, prevent deterioration in the existing status of waters, and achieve at least "good status" in relation to all waters by 2027 unless subject to extended deadlines. A water body must achieve both good 'ecological status' and good 'chemical status' before it can be considered to be at good overall status. An assessment of the risks to the achievement of these objectives for water bodies has been undertaken by the EPA through the extensive characterisation of water bodies and the key pressures acting upon them. This facilitates the development of a programme of measures to allow the achievement of the WFD objectives.

The Programme of Measures (POM) outlines the steps that will be taken to meet WFD objectives as applicable to each water body. This POM is contained within an overarching River Basin Management Plan (RBMP). These measures will require implementation at strategic level but also at regional and local level through the establishment of Regional Integrated Catchment Management Programmes. Whilst none of the water bodies within the proposed Marine SI area have been included amongst those areas prioritised for action in the most recent River Basin Management Plan for Ireland 2018 - 2021 (DHPLG, 2018), it is noted that measures required to ensure compliance with existing legislation will be implemented during this river basin management cycle.

Environmental Quality Standards (EQSs) for classifying surface water status are established in the European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (SI No. 272 of 2009), as amended. These regulations set standards for biological quality elements, physio-chemical conditions supporting biological elements (including general conditions and specific pollutants), priority substances and priority hazardous substances.

As shown in Figure 4.1 the 'ecological status' of a water body is established according to compliance with the EQSs for biological quality elements, physio-chemical conditions supporting biological elements, relevant pollutants and hydromorphological quality elements. The 'chemical status' of a water body is established according to compliance with the EQSs for priority substances and priority hazardous substances.

In addition to achieving good ecological and chemical status, a water body must achieve compliance with standards and objectives specified for protected areas, which include areas designated by the Bathing Water Directive; the Urban Waste Water Treatment Directive; the Shellfish Waters Directive; the Habitats Directive and the Birds Directive. Waters bodies that are compliant with WFD standards, but that contain protected areas that are non-compliant with protected area standards are downgraded to 'less than good' status.

Section 7.3 assesses the potential impact on the WFD status of the water bodies within which the proposed Marine SI will be undertaken.

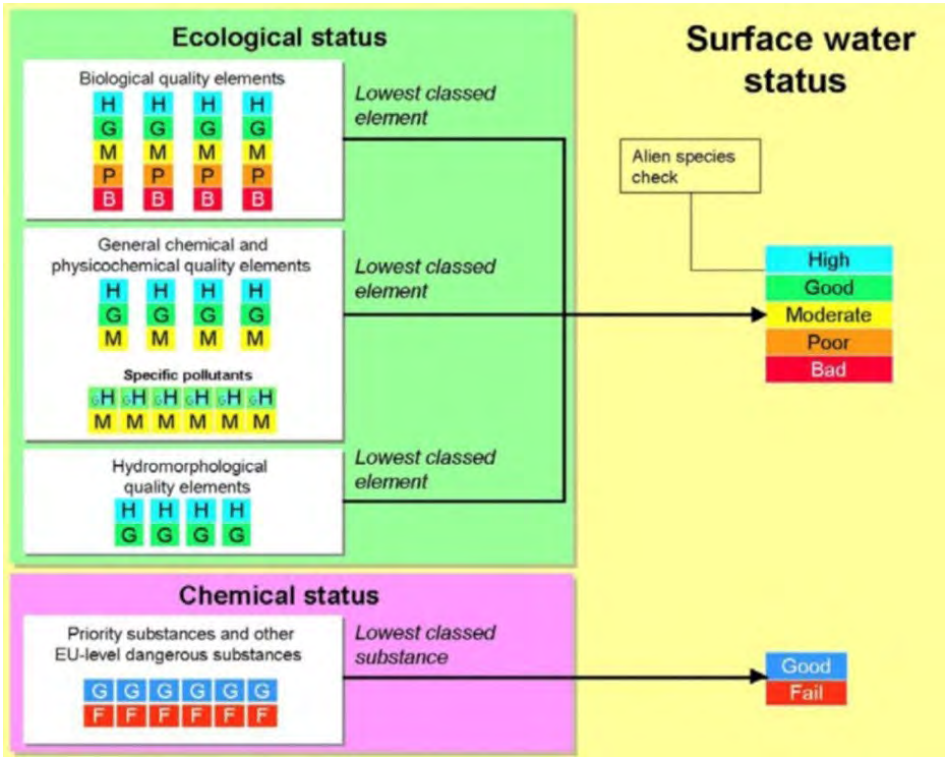

Figure 4.1: Elements of the Water Framework Directive Status

4.4 Marine Strategy Framework Directive

The Marine Strategy Framework Directive (MSFD) (2008/56/EC) was formally adopted by the European Union in June 2008 and is transposed into Irish law by the European Communities (Marine Strategy Framework) Regulations 2011, as amended. The overarching aim of the Directive is to protect Europe's marine waters by applying an ecosystem-based approach to the management of human activities while enabling the sustainable use of the marine environment for present and future generations. The Directive establishes a legal framework for the development of marine strategies designed to achieve Good Environmental Status (GES) in the marine environment by the year 2020. The marine strategy involves defining GES, setting environmental targets and indicators, implementing monitoring programmes for ongoing assessment, and developing and implementing programmes of measures to achieve or maintain GES.

GES is defined as '*the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations.'*

The assessment of GES is undertaken by reference to qualitative descriptors which define overarching objectives in respect of key socio-economic or ecological aspects of the marine environment. These specifically require the consideration of the following:

- biodiversity;
- non-indigenous species;
- Commercial fish and shellfish;

- food webs;
- human-induced eutrophication;
- sea-floor integrity;
- alteration of hydrographical conditions;
- contaminants in water and biota
- contaminants in seafood;
- marine litter; and
- the introduction of energy including underwater noise.

To date, an Initial Assessment (constituting a comprehensive review of the physical, chemical and biological characteristics of the marine area, as well as the human pressures acting upon it) has been undertaken (DEHLG 2013). A comprehensive set of environmental targets and associated indicators has been developed resulting in 25 revised environmental targets as outlined in Ireland's Article 17 update to Ireland's Marine Strategy Part 1: Assessment (Article 8), Determination of Good Environmental Status (Article 9) and Environmental Targets (Article 10) (DHPLG, 2020). These revised targets now align more closely with the requirements of the Birds and Habitats Directives, the Water Framework Directive, the Common Fisheries Policy. These are being used to demonstrate that GES has been achieved or is being maintained in accordance with the objectives of the MSFD. Almost half of the 11 qualitative descriptors for determining Good Environmental Status (GES) have fully achieved GES:

- non-indigenous species;
- human-induced eutrophication;
- alteration of hydrographical conditions;
- contaminants in water and biota
- contaminants in seafood

For marine litter and the introduction of energy both of these descriptors have fully achieved GES for the primary criteria assessed but lack of data and methodologies has prevented assessment of other primary criteria. Three have also partially achieved GES (Biodiversity, Commercial Fish and Shellfish and Sea Floor Integrity) due to different results for key elements assessed within descriptors. The environmental status of marine food webs in Ireland is currently unknown.

An updated monitoring programme has been established by the Department of Housing, Local Government and Heritage, and the Marine Institute to gather and provide scientific data and information for associated assessments, to determine if our marine waters are achieving or maintaining Good Environmental Status (GES) (DHLGH, 2021). The information is also used to identify changes in the environmental quality of Ireland's maritime area over time, to track the progress in achieving environmental targets, and to examine the effectiveness of measures designed to improve environmental outcomes. The programme of measures, first developed in 2015, has also been updated (DHLGH, 2022) which established 152 measures, built on existing national, European and International policy frameworks.

The achievement of GES supports the objectives of Marine Spatial Planning (MSP) and in particular, of the National Marine Planning Framework (NMPF). The environment policies in the NMPF have been split into nine categories largely aligned to the MSFD GES descriptors including water quality with a number of water quality

policies and environmental targets aligned with the MSFD GES descriptors, eutrophication and contaminants at levels not giving rise to pollution effects (DHLGH, 2021). The assessment of the status of the marine environment and the determination of the characteristics of GES, including threshold values and environmental targets, inform decisions about how to use marine resources sustainably.

To date, the extent of achievement of GES has not been established for individual water bodies, therefore the water quality assessment undertaken in this assessment relies on the WFD water quality assessment, including protected areas, to ensure that the proposed Marine SI works will not compromise the achievement of the objectives of the MSFD.

4.5 Habitats Directive

4.5.1 Introduction

With the introduction of the Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitat and of wild fauna and flora) came the obligation to establish the Natura 2000 network of Sites of Community Interest (SCIs), comprising a network of areas of highest biodiversity importance for rare and threatened habitats and species across the European Union (EU). In Ireland, the Natura 2000 network of sites comprises Special Areas of Conservation (SACs, including candidate SACs) designated under domestic legislation transposing Directive 92/43/EEC, and Special Protection Areas (SPAs, including proposed SPAs) classified under the Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds) and designated under the same domestic legislation. SACs are designated for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are designated for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is designated correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived. SACs and SPAs make up the pan-European network of Natura 2000 sites. It should be noted that ‘European sites’ are defined in Regulation 2(1) of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended (‘the 2011 Regulations’).

4.5.2 Appropriate Assessment

With the introduction of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitat and of wild fauna and flora) came the obligation to establish the Natura 2000 network of Sites of Community Interest (SCIs), comprising a network of areas of highest biodiversity importance for rare and threatened habitats and species across the European Union (EU). In Ireland, the Natura 2000 network of sites comprises Special Areas of Conservation (SACs, including candidate SACs) designated under domestic legislation transposing Directive 92/43/EEC, and Special Protection Areas (SPAs, including proposed SPAs) classified under the Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds) and designated under the same domestic legislation. SACs are designated for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are designated for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is designated correspond to the qualifying

interests of the sites; from these the conservation objectives of the site are derived. SACs and SPAs make up the pan-European network of Natura 2000 sites. It should be noted that 'European sites' are defined in Regulation 2(1) of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended ('the 2011 Regulations').

4.5.2.1 Appropriate Assessment procedure

According to European Commission guidance documents 'Assessment of plans and projects in relation to Natura 2000 sites' (EC, 2021); 'Guidance document on wind energy developments and EU nature legislation' (EC, 2020); and 'Managing Natura 2000 sites: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC' (EC, 2019); the obligations arising under Article 6 establish a step-wise procedure as illustrated in Figure 4.2

The first part of this procedure consists of a pre-assessment stage ('screening') to determine whether, firstly, a plan or project is directly connected with or necessary to the management of the site, and secondly, whether it is likely to have a significant effect on the site; it is governed by Article 6(3), first sentence.

The second part of the procedure, governed by Article 6(3), second sentence, relates to the appropriate assessment and the decision of the competent national authorities.

A third part of the procedure (governed by Article 6(4)) comes into play if, despite adverse effects on the integrity of the site concerned, it is proposed not to reject a plan or project but to give it further consideration. In this case Article 6(4) allows for derogations from Article 6(3) under certain conditions.

The extent to which the sequential steps of Article 6(3) applies to a given plan or project depends on several factors, and in the sequence of steps, each step is influenced by the previous step. The order in which the steps are followed is therefore essential for the correct application of Article 6(3).

Each step determines whether a further step in the process is required. If, for example, the conclusion at the end of a Habitats Directive stage one screening appraisal is that significant effects on European sites can be excluded in the absence of any best practice or targeted measures intended to avoid or reduce the harmful effects of the proposed development on European sites, there is no requirement to proceed to the next step.

4.5.2.2 Screening

Regulation 42 of the 2011 Regulations requires inter alia that screening for appropriate assessment of a project for which an application for consent is received, and which is not directly connected with or necessary to the management of the site as a European Site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that project, individually or in combination with other plans or projects is likely to have a significant effect on the European site.

A screening for appropriate assessment of an application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that proposed development, individually or in combination with another plan or project is likely to have a significant effect on a European site.

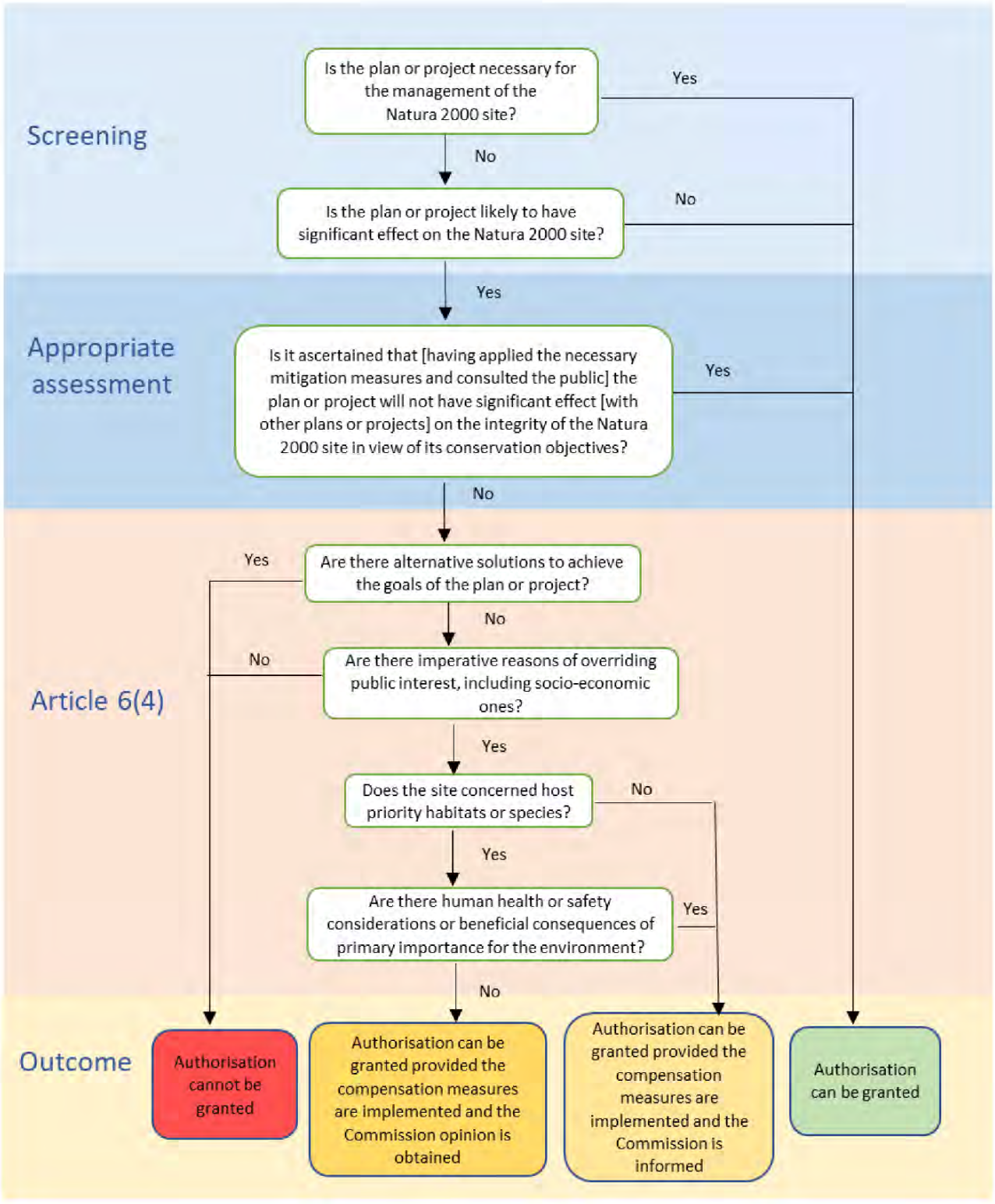

Figure 4.2: Stepwise procedure of Article 6 of the Habitats Directive (from EC, 2021)

4.5.2.3 Supporting Information for Screening for Appropriate Assessment

A Supporting Information for Screening for Appropriate Assessment (SISAA) has been submitted under separate cover in support of the application for a Marine Usage Licence for the Marine SI for the Foynes Island Deepwater Terminal. The purpose of this document, which contains information to support screening for appropriate assessment (supporting information for screening for appropriate assessment or 'SISAA'), is to provide the competent authority with information to assist them in carrying out a screening for appropriate assessment of the implications of the proposed marine site investigation works project at Foynes Island on European sites in view of their conservation objectives.

This exercise has been conducted on behalf of Shannon Foynes Port Company in support of an application to the Maritime Area Regulatory Authority (MARA) under the Maritime Area Planning Act 2021.

Section 112 of the MARA states that the Maritime Area Regulatory Authority (MARA) is the 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. The SISAA report (Appendix D) seeks to assist MARA as a public authority under the 2011 Regulations in fulfilling its obligations to conduct a screening for appropriate assessment, and where applicable, an appropriate assessment.

5 PLANNING & DEVELOPMENT

5.1 Policy Context

5.1.1 National Policy

5.1.1.1 National Planning Framework 2018

The National Planning Framework (NPF) forms the top tier of the national planning policy structure in Ireland. It establishes the policy for the Regional Spatial and Economic Strategies (RSES) and local level development plans. It aims to move away from developer-led development and towards the needs and requirements of society up to 2040. A number of objectives and policies have been laid out in order for Ireland to grow and develop sustainably. These include:

- Developing a region-focused strategy for managing growth;
- Linking this to a new 10-year investment plan (the Project Ireland 2040 National Development Plan 2018-2027);
- Using state lands for certain strategic purposes;
- Supporting this with strengthened, more environmentally focused planning at local level; and
- Backing the framework up in law with an Independent Office of the Planning Regulator.

Ireland's port and shipping services play a vital role in delivering economic growth. They are critical areas of infrastructure for international trade. In fact, over 90% of Ireland's international trade moves by sea. With this in mind, the NPF sets out an objective (National Policy Objective 40) to:

> *"Ensure the strategic development requirements of Tier 1 and Tier 2 ports of regional significance and smaller harbours are addressed as part of Regional Spatial and Economic Strategies, metropolitan area and city / county development plans, to ensure the effective growth and sustainable development of the city regions and rural areas."*

5.1.1.2 National Marine Planning Framework

The National Marine Planning Framework (NMPF) aims to set out how Ireland should use, protect and enjoy its seas. The plan has been informed by existing sectoral plans and will, in turn, be used to inform future cycles of those plans in an ongoing feedback loop. It provides a coherent framework in which those sectoral policies and objectives can be realised. It will become the key decision-making tool for regulatory authorities and policy makers helping guide decisions on individual authorisation applications.

The marine plan covers Ireland's maritime area, including internal waters (sea area), territorial seas, exclusive economic zone (EEZ) and continental shelf. The maritime area comprises approx. 490,000 km^2 and extends from the mean high-water mark at the coast seaward to in excess of 200 nautical miles in parts. Currently, the NMPF consists of a single plan for the entire maritime area, and it is envisaged that more detailed regional plans will be made at a later date.

The NMPF recognises that safeguarding as well as sustainably and strategically developing port, harbour and shipping infrastructure is key to the future needs of society and enterprise in Ireland. The plan lays out ten policies on Ports, Harbours and Shipping.

5.1.1.3 Statement of Compliance with the National Marine Planning Framework

This document outlines how the Maritime Area Usage Licence Application is compliant with the objectives of National Planning Framework Act 2021. This statement of compliance is included in Appendix A.

5.1.2 Regional Policy

5.1.2.1 Regional Spatial & Economic Strategy for the Southern Region (2018-2027)

The RSES for the Southern Region is the regional translation of the NPF (see Section **Error! Reference source not found.**) for the southern region of Ireland which includes County Limerick. It seeks to unlock the latent potential of less developed areas while increasing the competitiveness of the more developed areas. Quality of life for all and safeguarding Ireland's environment for future generations is a core principle of the RSES.

The RSES is a 12-year strategic regional development framework spanning from 2018 to 2027, aiming to establish a broad framework for the way in which society, environment, economy and land use should evolve. The RSES aims to support the programme for change set out in Project Ireland 2040 and the NPF.

The vision set out in the RSES is to:

- Nurture all places and realise their full potential;
- Protect and enhance the environment;
- Successfully combat climate change;
- Achieve economic prosperity and improved quality of life for all citizens;
- Accommodate expanded growth and development in suitable locations; and
- Make the Southern Region one of Europe's most creative, innovative, greenest and liveable regions.

The RSES contains a number of policies relating to the marine and coastal assets, maritime spatial planning and growing the blue economy. Some of the key policies include:

- **RPO 76: Marine Economy** – *"to ensure alignment, and consistency between land use and ocean-based planning, and to ensure co-ordination, which supports the protection of the marine environment and the growth of the marine economy."*
- **RPO77: Maritime Spatial Planning (Consistency and Alignment)** – *"to support the integration of different uses in the marine environment and ensure consistency and alignment between high-level plans…regional based approaches…and localised…plans…"*
- **RPO 78: First Mover under the National Marine Planning Framework** – *"to support the sustainable development of the potential of the marine environment, to foster opportunities for innovation in the*

maritime economy and drive forward the Region as a first mover under marine spatial planning while preserving the environmental and ecological conservation status of our marine natural resource."

- **RPO 80: Marine Resource and Blue Economy** – *"to support the development of new coalitions amongst productive sector enterprises, coastal communities and public agencies to support the sustainable development of the marine resource and Blue Economy."*
- **RPO 85: Renewable Offshore Energy** – *"to promote regional cooperation in terms of offshore renewable energy development, environmental monitoring and awareness of the benefits of realising the Region's offshore energy potential."*

5.1.3 Local Policy

5.1.3.1 Limerick Development Plan 2022-2028

The Limerick Development Plan aims to form a development strategy to 2028 and beyond. The strategic vision recognises the potential of Limerick to align with the key growth objectives set out in the higher order spatial plans to take advantage of the assets of the City and County.

The Plan is underpinned by a number of interlinked strategic objectives. These objectives are as follows:

- Grow Limerick's economy and create opportunity through maximising the potential for development through the promotion and enhancement of the competitive advantages of Limerick;
- Transition to an environmentally sustainable carbon neutral economy
- Ensure new and existing residential development is of the highest quality to create sustainable, healthy, inclusive and resilient communities;
- Support and facilitate revitalisation and consolidation of the cities, towns and villages;
- Promote, support and enable sustainable and economic development, enterprise and employment;
- Enhance connectivity across Limerick;
- Protect, enhance and ensure the sustainable use of key infrastructure;
- Protect, conserve and enhance the built and cultural heritage of Limerick;
- Support growth in the tourism sector in Limerick.

The Plan recognises the marine economy as a vital part of Limerick's future economic development. With the presence of Shannon Foynes Port and Limerick's location on the Shannon Estuary, Limerick is ideally placed to enhance economic growth through the sustainable use of its marine resource. In fact, an objective of the Limerick Development Plan, Objective ECON O58, specifically relates to Shannon Foynes Port. It is an objective of the council to:

- Support the expansion of the Port at Foynes and promote the economic and industrial development of the Shannon Estuary;
- Promote and support the Shannon Foynes Port Company's Masterplan '*Vision 2041'.*

Furthermore, Objective TR O28, Docks and Ports, states that:

> *"It is an objective of the Council to support the continued development of Shannon Foynes Port as and EU Core Network Port (TEN-T) …"*

And Objective CAF O33, Development of Foynes Port, states that:

> *"It is an objective of the Council to support the development of Foynes Port, as a support base for offshore wind…"*

5.2 Pre-Application Consultation

Prior to making the Maritime Usage Area License to Department of Housing, Local Government and Heritage (DHLGH), RPS consulted with a number of relevant stakeholders to inform them of the proposed marine SI. This chapter provides a summary of the pre-application consultation which took place.

5.2.1 Pre-application consultation with relevant statutory stakeholders

Letters and information packs (including drawings) were issued to relevant statutory stakeholders as part of the pre-application consultation phase. The following consultees received the information pack:

- Development Applications Unit of Department of Culture, Heritage and the Gaeltacht[1]
- Inland Fisheries Ireland (IFI)
- Marine Survey Office (MSO)
- Sea Fisheries Protection Authority (SFPA)
- Marine Institute (MI)
- Limerick City and County Council (LCCC)
- Clare County Council (CCC)

Responses were received from the following organisations:

- Underwater Archaeological Unit and National Parks and Wildlife Service of Department of Culture, Heritage and the Gaeltacht (letter received by email on 21st March 2023 via the DAU)
- MSO (letter received by email on 2nd February 2023)
- SFPA (letter received by email on 24th January 2023)
- CCC (letter received by email on 13th February 2023)

A copy of the replies from the consultees is provided in Appendix B of this AIMU report and a short summary is provided below.

[1] The Development Applications Unit (DAU) is the co-ordination unit for consultations with National Parks and Wildlife Service and National Monuments Service.

5.2.1.1 Development Applications Unit (DAU), Department of Housing, Local Government and Heritage

Archaeology (Underwater)

It is noted that the proposed Marine Site Investigation areas are situated at or in relation to a Recorded Monument, which is subject to statutory protection in the Record of Monuments and Places Under Section 12(c) of the National Monuments (Amendment) Act 1994 any person proposing to carry out, or to cause or to permit the carrying out of, any work at or in relation to a Recorded Monument must give notice in writing to the Minister for Housing, Local Government and Heritage two months before commencing that work.

It is also noted that the Wreck Inventory of Ireland includes a protected wreck in the proposed survey area and further entries for losses in the environs of the proposed development area. It should be noted, also, that the Inventory is largely based on documentary sources available from after AD 1700. As such, previously unrecorded wreck sites, including those dating to earlier periods, may await discovery in the study area. It is important to ensure compliance with Section 3 of the National Monuments (Amendment) Act 1987. If underwater Archaeological Heritage materials are identified, they may require the institution of exclusion zones and buffers to facilitate their protection.

Nature Conservation

The proposed development may be within and adjacent to several Natura sites. These sites are designated for a range of habitats, communities and species. In addition, there are designations under national legislation and under international agreements within a distance of the proposed development. It is important to ensure that mapping of the development and the likely direct and indirect impacts that could arise to those sites or species of conservation interest is caried out.

Natura Impact Statement

According to Article 6(3) of Council Directive (92/43/EEC) (the Habitats Directive) any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in relation to the site's conservation objectives. The provisions of this article have been transposed into the Irish Statute by Regulation 42 of the European Communities (Birds and Natural Habitats) Regulations (SI 477 of 2011).

Particular attention should be paid to the conservation objectives framed around the Area, Range, Structure & Function and Future Prospects for each qualifying interest. It might also be useful to review recent case law relating to the development of Article 6 of the Habitats Directive and in particular the application of conservation objectives for Natura sites.

In order to fulfil the Article 6 legal requirements, the following information should be supplied within the application in relation to Annex I habitats and Annex II species:

A. Full description of proposed operation/activity

- A full and finalised description of the proposed methodology including the likely timescale of works.

- Are there similar operations/activities already in the locality? If existing operations/activities occur adjacently then a justification for additional facilities should be included. Would the proposed works act in conjunction with any existing or planned developments?
- The facilities or licensing to be put in place to cope with both biological and industrial waste generated during the proposed survey work should be detailed. Detailed contingency plans sufficient to address potential negative interactions with the marine environment.

B. Baseline description of relevant environment

- A description of the biological environment over which the activity would impact marine and terrestrial flora and fauna must be included if work is envisaged within or in proximity to Nature sites.
- The design and duration of ecological surveys should be sufficient to evaluate the potential impacts through all stages of the year.
- Consideration should be given to whether the likely works would result in disturbance or loss to Annex I or Annex II qualifying interests in Special Areas of Conservation or to bird species in Special Protected Areas. Any loss or interruption of normal processes must be quantified relative to the entire designated area not just within the direct footprint of development.
- It must be ensured that the survey or construction operations are compliant with “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters”.

Under Article 12 of the Council Directive 92/43/EEC (the Habitats Directive), it is an offence to deliberately capture, disturb or kill a cetacean or take actions that result in deterioration or destruction of their breeding sites or resting places. This has been transposed into Irish Law by Regulation 51 of the European Communities (Birds and Natural Habitats) Regulations. Introduction of certain sound sources into the marine environment, as may result from construction or surveys over the foreshore, have the potential to cause injury and possibly mortality in these species. All marine mammals are protected wild animals under the Fifth Schedule of the Wildlife Act (39 of 1976) and Amendments. Under Section 23 (as amended in 2000), it is an offence to kill, injure or wilfully interfere with or destroy the breeding place or resting place of any protected wild animal.

It is recommended that a Regulation 54 consent should be applied for at the earliest opportunity to ensure that activities can be appropriately considered in terms of the potential for disturbance that may arise from their proposed site investigations.

5.2.1.2 Marine Survey Office (MSO)

The MSO advised that any comments with regards to the maritime usage area licence application shall be addressed to the DHLGH when requested by them.

5.2.1.3 Sea Fisheries Protection Authority (SFPA)

The SFPA advised that they are not the decision makers in relation to maritime usage area license and their role is to provide advice to the Minister for Agriculture, Food and the Marine on the possible impact of proposed developments on wild fisheries, shellfish growing areas and seafood safety.

They stated that they were not in a position to review the proposal. However, they added that the application may be reviewed when the maritime usage area licence is presented to DAFM for consideration, and they forward it on to the SFPA for comment.

5.2.1.4 Clare County Council (CCC)

CCC welcomed the proposal to undertake the marine SI to inform the associated maritime usage area license which will help deliver offshore renewable energy by 2030.

CCC believe that the proposal is consistent with the vision of *Clare County Development Plan 2017-2023* and the draft *Clare County Development Plan 2023-2029* together with the *Clare Renewable Energy Strategy*. In addition, they state that the project aligns with regional objectives within the Shannon Estuary as set out in the *Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary*.

In formulating the programme of site investigations, given the site is identified as a Strategic Development Location within the SIFP, the project will be subject to three levels of mitigation arising from the Natura Impact Report and the SEA process as follows:

- Over-arching mitigation
- Site specific mitigation measures
- Mitigation measures per theme

In addition, CCC highlight the importance of assessing the cumulative and in-combination effects arising during the marine SI.

Overall, CCC welcome the SI at Foynes Island and ask that this submission be considered as part of the preparation of the final programme of surveys.

5.2.2 Consultation with other relevant stakeholders

The Marine SI works will take place entirely below the High-Water Mark (HWM) and there will be no access required on Foynes Island at any stage by the SI Contractor. The private landowners on Foynes Island however have been kept informed on the proposed Foynes Island developments including the Marine SI. A point of contact is available in SFPC for the landowners to liaise with on any aspect of the Foynes Island development including the Marine SI.

6 LAND, SOILS, GEOLOGY & HYDROGEOLOGY

6.1 Introduction

This section of the AIMU report identifies, describes, and assesses the potential impacts and effects of the proposed works on land, soils, geology and hydrogeology and has been completed in accordance with guidance set out in Section 1.2.

6.2 Receiving Environment

6.2.1 Marine

6.2.1.1 Sediment

Most of the classified marine sediment in the vicinity of Foynes Island is made up of sand. More specifically, there are areas of circalittoral fine and muddy sand to the north and northeast and areas of infralittoral fine and muddy sand to the south and east of Foynes Island. The European Nature Information System (EUNIS) descriptions of infralittoral and circalittoral fine and muddy sand are given below:

- Infralittoral fine sand (EUNIS Habitat Type code A5.23) – "*Clean sands which occur in shallow water, either on the open coast or in tide-swept channels of marine inlets.*"
- Infralittoral muddy sand (EUNIS Habitat Type code A5.24) – "*Non-cohesive muddy sand (with 5% to 20% silt/clay) in the infralittoral zone, extending from the extreme lower shore down to more stable circalittoral zone at about 15-20 m.* "
- Circalittoral fine sand (EUNIS Habitat Type code A5.25) – "*Clean fine sands with less than 5% silt/clay in deeper water, either on the open coast or in tide-swept channels of marine inlets in depths of over 15-20 m.*"
- Circalittoral muddy sand (EUNIS Habitat Type code A5.26) – "*Circalittoral non-cohesive muddy sands with the silt content of the substratum typically ranging from 5% to 20%. This habitat is generally found in water depths of over 15-20 m…*"

There are also areas of mixed sediment in the area. More specifically, there are areas of circalittoral and sublittoral mixed sediments to the north and west of Foynes Island. The EUNIS descriptions of circalittoral and sublittoral mixed sediments are given below:

- Sublittoral mixed sediment (EUNIS Habitat Type code A5.4) - "*Sublittoral mixed (heterogeneous) sediments found from the extreme low water mark to deep offshore circalittoral habitats. These habitats incorporate a range of sediments including heterogeneous muddy gravelly sands and also mosaics of cobbles and pebbles embedded in or lying upon sand, gravel or mud.*"
- Circalittoral mixed sediment (EUNIS Habitat Type code A5.44) - "*Mixed (heterogeneous) sediment habitats in the circalittoral zone (generally below 15-20 m) including well mixed muddy gravelly sands or very poorly sorted mosaics of shell, cobbles and pebbles embedded in or lying upon mud, sand or gravel."*

There are areas of marine sediment to the east and southeast of Foynes Island that are currently unclassified, but it is assumed that these areas also comprise mainly of sand and mixed sediment. Figure 6.1 shows a map of the different substrate types found near to the foreshore boundary area.

6.2.2 Terrestrial

6.2.2.1 Land Cover

According to CORINE 2018 data, the main land cover type in Foynes and Foynes Port is artificial surfaces, mainly made up of industrial, commercial and transport units. There are forest areas to the west and south-west of Foynes and on Foynes Island. These areas of forest and artificial surfaces are surrounded by agricultural areas and pastures. Figure 6.2 shows a map of the different land cover types found near to the foreshore boundary area.

6.2.2.2 Soils

From Geological Survey Ireland Quaternary Sediment Mapping, parts of Foynes Island are overlain with Limestone till, and other parts consist of bedrock outcrops. This means that bedrock is relatively shallow on the island. As there is no soils data for Foynes Island, it is assumed that soils are shallow and reasonably well drained.

Soils on the mainland under the town of Foynes and Foynes Port is mainly made up of Urban areas. However, to the west of the proposed works soils are predominantly Ballincurra, a calcareous brown earth soil with a fine loamy texture set atop limestone bedrock. There are also areas of tidal marsh to the south-east of the proposed works, near the mouth of the River Ahacronane. Figure 6.3 shows a map of the different soil types found near to the foreshore boundary area.

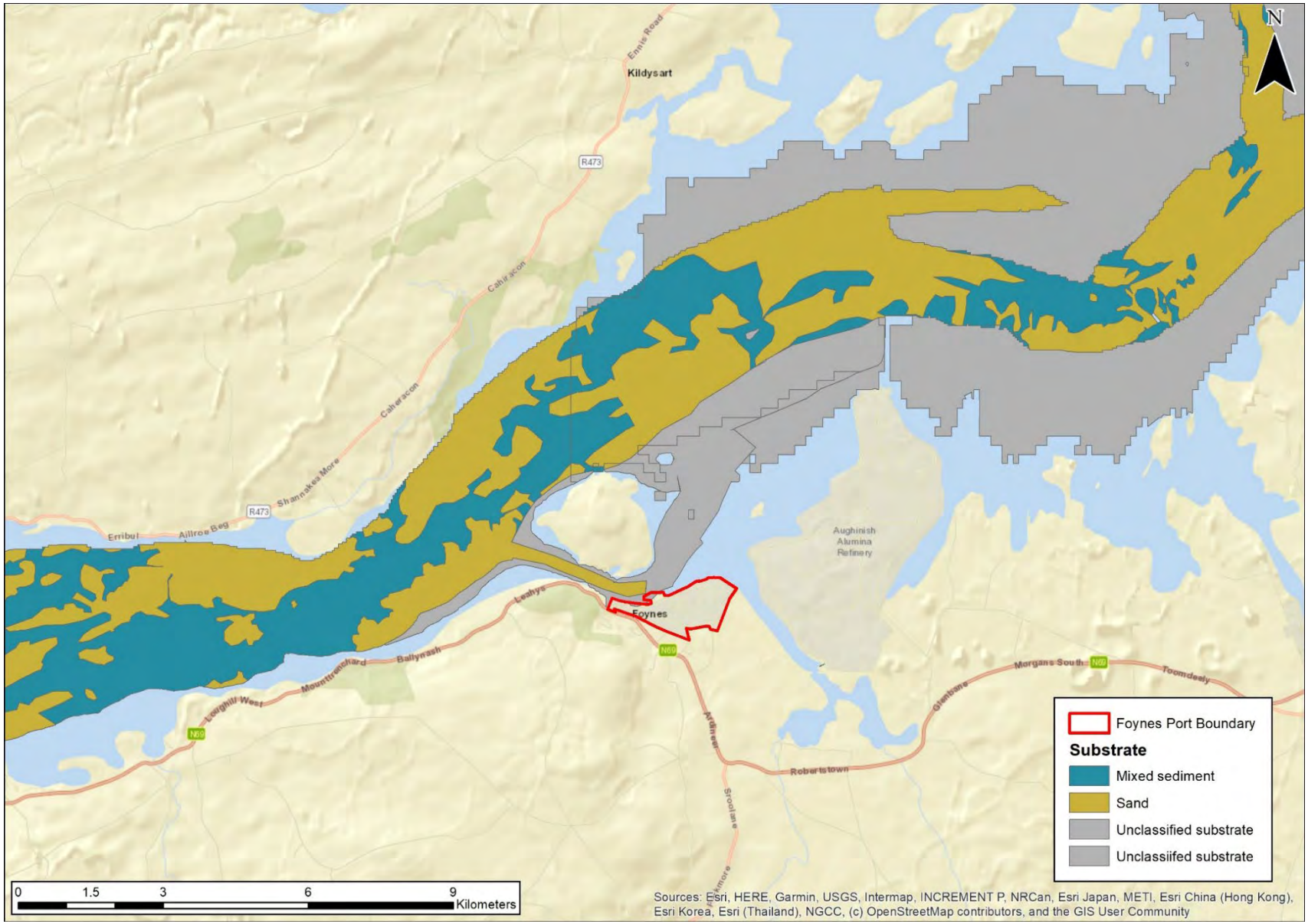

Figure 6.1: Map of marine substrate types in the Shannon Estuary near Foynes

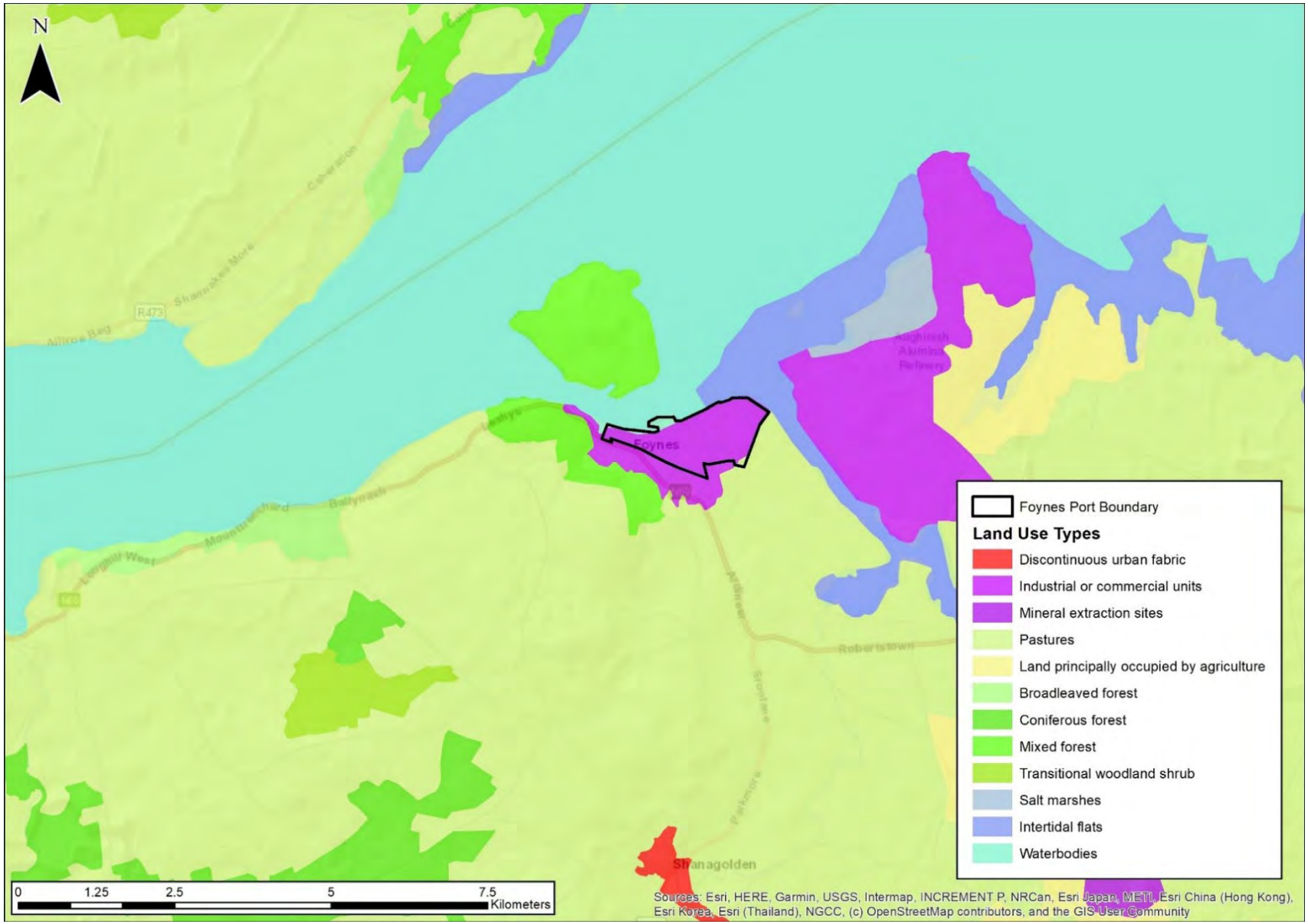

Figure 6.2: Land cover map near Foynes

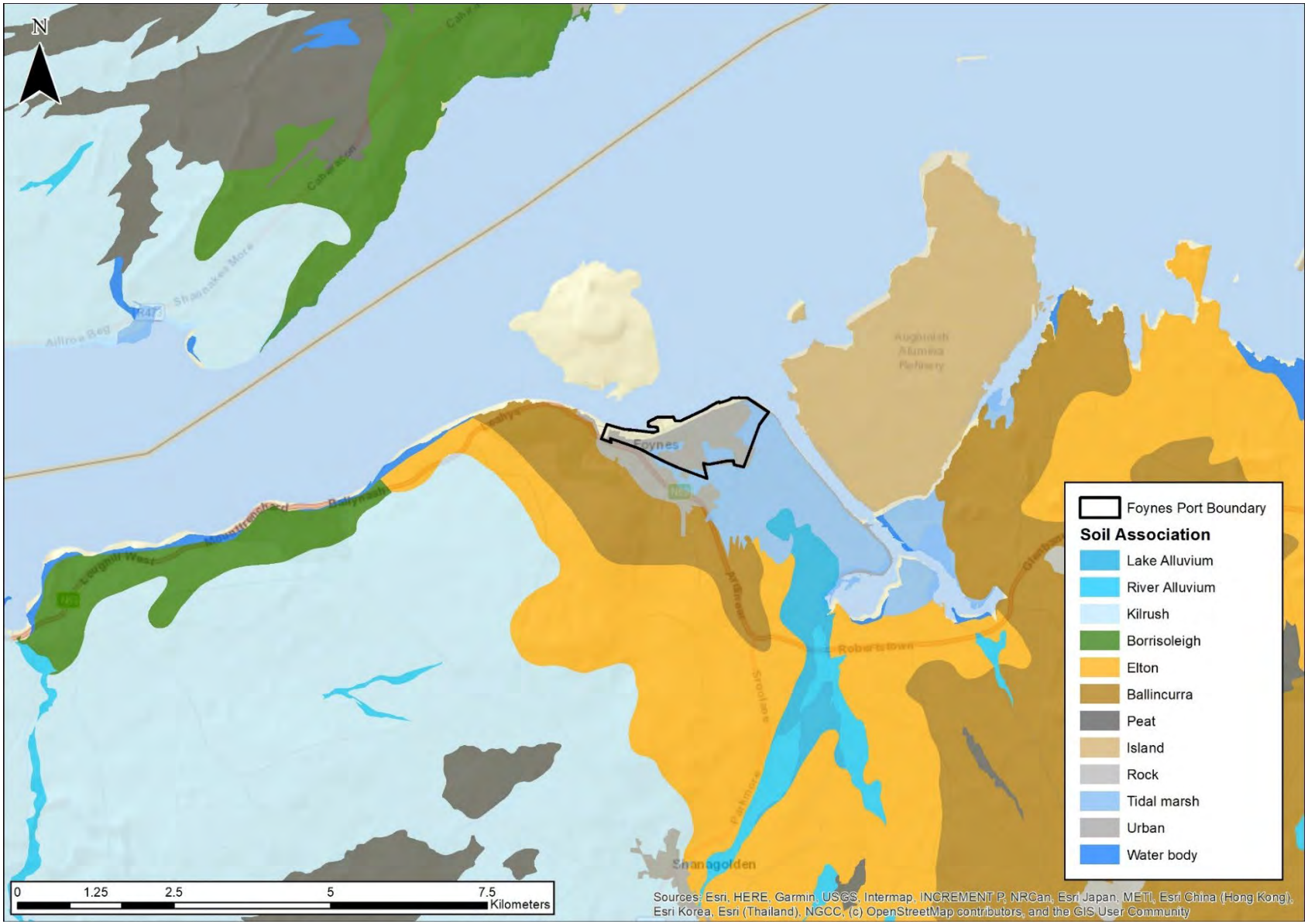

Figure 6.3: Soil map near Foynes

6.2.2.3 Geology

Predominant bedrock type on Foynes Island is grey Siltstone and Sandstone from the Carboniferous period. In addition, Foynes Island is an audited Geological Heritage Site in County Limerick which was designated for its importance at County level due to it hosting the type localities for two goniatite species as well as containing coastal exposures of Namurian lithologies of the Clate Basin (also referred to as the Shannon Trough or Shannon Basin).

Bedrock on the Foynes side (under where the bridge is proposed) is primarily Durnish formation blue-black cherty bioclastic limestone. Available borehole records confirm that the island is underlain with mudstone with occasional thin bands of siltstone. There are no Geological Heritage Sites located in close proximity to the proposed works on this side of the Shannon Estuary. Figure 6.4 shows a map of the bedrock geology found near to the foreshore boundary area.

6.2.2.4 Hydrogeology

The foreshore licence area is located near to two aquifer domains:

- Poor Aquifer (PU); and
- Locally Important Aquifer (LI).

The PU designation represents bedrock which is generally unproductive while the LI designation represents bedrock which is moderately productive only in local zones. A Regionally Important Aquifer - Karstified (conduit) is present approximately 2km to the east of the foreshore licence area.

The majority of this project lies near areas of extreme groundwater vulnerability or within an area of Rock or near surface karst. Figure 6.5 shows a map of groundwater vulnerability near to the foreshore boundary area.

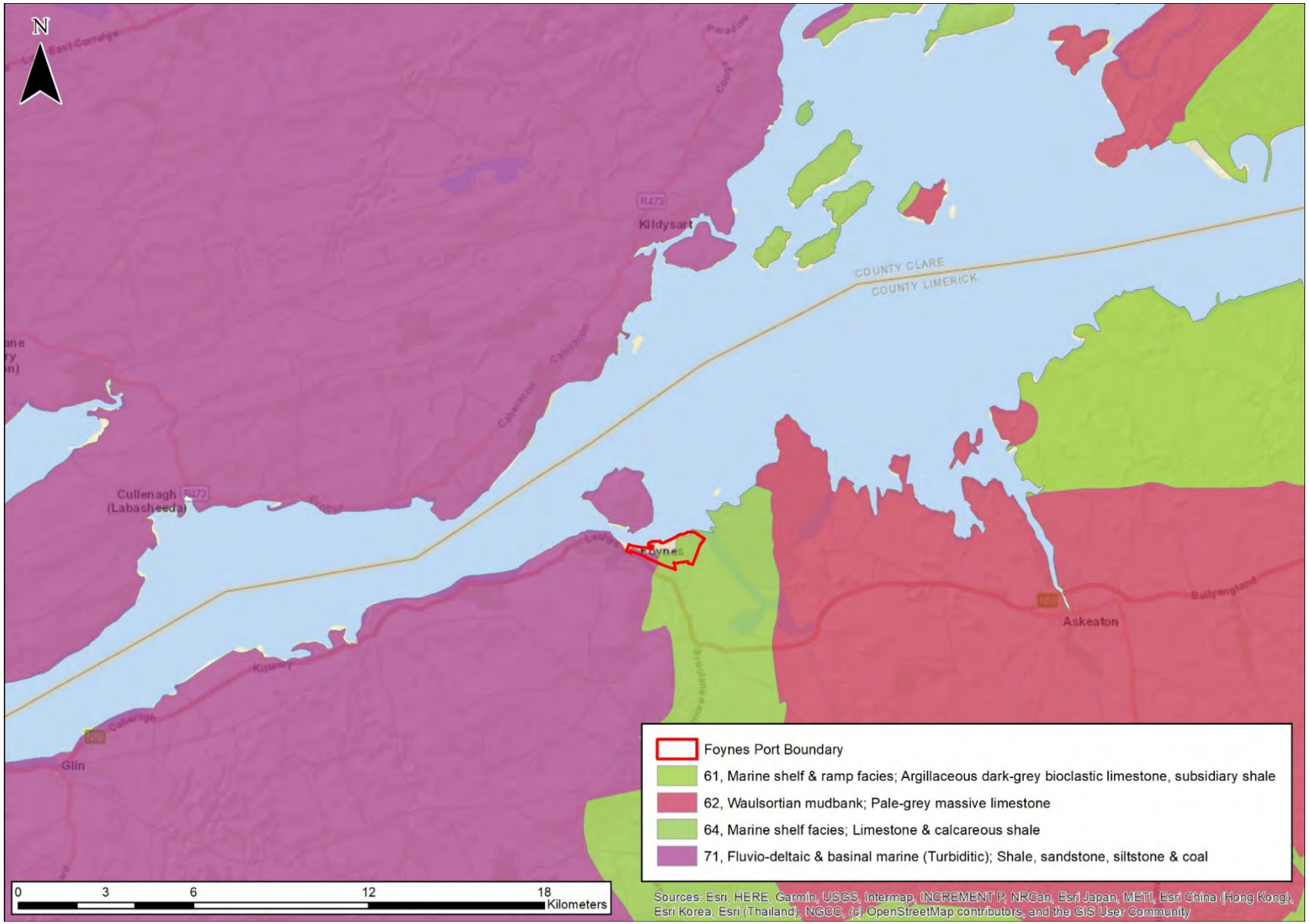

Figure 6.4: Bedrock geology near Foynes

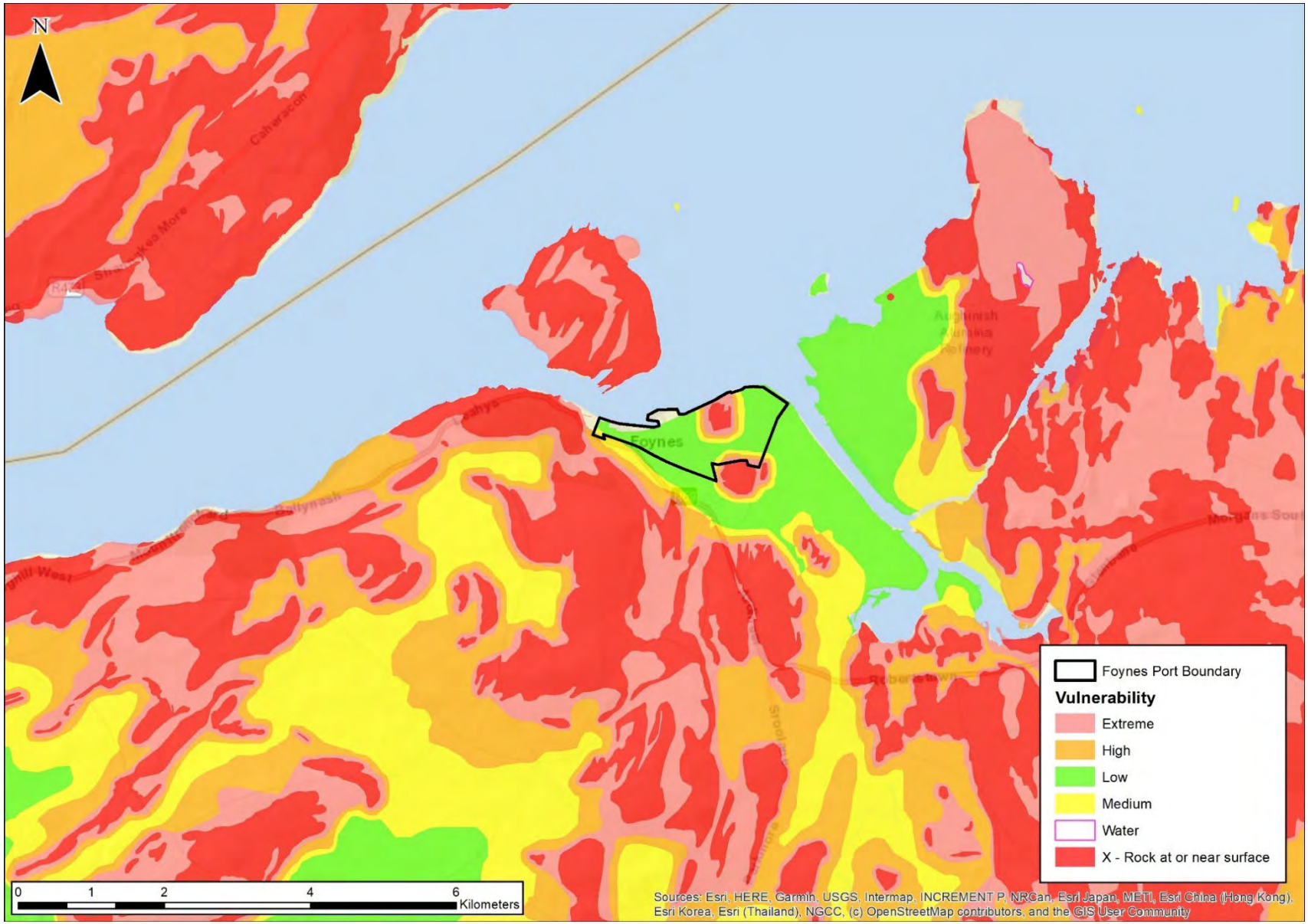

Figure 6.5: Map of groundwater vulnerability near Foynes

6.3 Potential Impacts

6.3.1 Marine

6.3.1.1 Sediment

It is possible that a slight negative impact on sediments may arise due to the marine SI works. The drilling of boreholes and removal of sediment from the seabed may introduce sediment into the water column. The geographical extent of this impact would likely be limited mainly to the Marine Usage Licence Area however, currents and tides may mean that areas out with may also be impacted. However, it is expected that any impacts will be short-term, and conditions will likely return to baseline after works are completed.

Overall, the sensitivity of the receptor is deemed to be **Low,** and the magnitude of impacts is also **Low**. This means that impacts are expected to be **Negligible** or **Minor.**

6.3.2 Terrestrial

6.3.2.1 Land Cover

As the proposed works will be undertaken entirely in the Shannon Estuary, there are no direct impacts expected on land cover in the nearby area. Therefore, the sensitivity of the receptors is **Negligible,** and the magnitude of impacts is also **Negligible**.

6.3.2.2 Soils

As the proposed works will be undertaken entirely in the Shannon Estuary, there are no direct impacts expected on soils in the nearby area. Therefore, the sensitivity of the receptors is **Negligible,** and the magnitude of impacts is also **Negligible**.

6.3.2.3 Geology

As the proposed works will be undertaken entirely in the Shannon Estuary, there are no direct impacts expected on terrestrial geology in the nearby area. Therefore, the sensitivity of the receptors is **Negligible,** and the magnitude of impacts is also **Negligible**.

6.3.2.4 Hydrogeology

As the proposed works will be undertaken entirely in the Shannon Estuary, there are no direct impacts expected on hydrogeology in the nearby area. Therefore, the sensitivity of the receptors is **Negligible,** and the magnitude of impacts is also **Negligible**.

6.4 Mitigation Measures

6.4.1 Marine

No mitigation measures recommended for marine soils, geology and hydrogeology as the proposed works were deemed to only have **Negligible** to minor impacts on these receptors in the area.

6.4.2 Terrestrial

No mitigation measures recommended for terrestrial land cover, soils, geology and hydrogeology as the proposed works were deemed to only have **Negligible** impacts on these receptors in the area.

7 WATER

7.1 Introduction

This chapter of the AIMU report identifies, describes and assesses the potential impacts and effects of the proposed works on water aspects (water quality, hydrology and flooding) of the receiving environment, and has been completed in accordance with the guidance set out in Section 1.2.3.

The objectives of this assessment are:

- Produce a baseline desk study of the existing water environment in the area of the proposed works;
- Identify any likely significant effects of the proposed works;
- Identify any mitigation measures to avoid, remediate or reduce likely significant negative effects; and
- Assess whether there are any likely significant residual or cumulative effects of the proposed works and other local projects.

7.2 Receiving Environment

7.2.1 Water Quality

Foynes Island lies within the Lower Shannon Estuary Transitional waterbody (IE_SH_060_0300) and Foynes Harbour Transitional waterbody (IE_SH_060_0350). Foynes Island also lies within the Ballylongford groundwater body (IE_SH-G-030). This waterbody has achieved and maintained 'good' status since the 2007-2012 WFD Monitoring Cycle as reported in 2017. Table 7.1 shows a list of key waterbodies in the area as well as their codes, type and distance from the proposed works.

Table 7.1: Waterbodies in close proximity to the proposed works

Waterbody Name	Waterbody Code	Waterbody Type	Distance from Proposed Works
Lower Shannon Estuary	IE_SH_060_0300	Transitional	Works within waterbody
Foynes Harbour	IE_SH_060_0350	Transitional	Works within waterbody
Upper Shannon Estuary	IE_SH_060_0800	Transitional	18km north-east
Deel Estuary	IE_SH_060_0600	Transitional	9km east
Fergus Estuary	IE_SH_060_1100	Transitional	6km north-east
Foynes_010	IE_SH_2F230770	River	600m south-west
Mouth of the Shannon	IE_SH_060_0000	Coastal	40km west
Ballylongford	IE_SH_G_030	Groundwater	Foreshore boundary adjacent to waterbody
Shanagolden	IE_SH_G_203	Groundwater	Foreshore boundary adjacent to waterbody

All the waterbodies listed in the above table are within or hydrologically linked to SAC and SPA designated sites (i.e. River Shannon and River Fergus Estuaries SPA and Lower River Shannon SAC).

There are no nearby bathing waters that may be impacted by SI. The closest bathing water area is Cappagh Pier, Kilrush, is located approximately 25km west of the foreshore licence area, on the northern shore of the Shannon Estuary. Cappagh Pier currently has excellent water quality. While this site is hydrologically linked with the marine SI site, the distance from the site means that any impacts are extremely unlikely.

Table 7.2 shows the overall WFD status of the relevant waterbodies from 2010-2021.

Table 7.2: WFD Status of Waterbodies in close proximity to the proposed works

Waterbody	Overall WFD Status		
	2010-2015	2013-2018	2016-2021
Lower Shannon Estuary	Moderate	Good	Good
Foynes Harbour	Unassigned	Good	High
Upper Shannon Estuary	Poor	Poor	Poor
Deel Estuary	Moderate	Moderate	Moderate
Fergus Estuary	Moderate	Moderate	Moderate
Foynes_010	Unassigned	Unassigned	Poor
Mouth of the Shannon	Moderate	Good	Good
Ballylongford	Good	Good	Good
Shanagolden	Good	Good	Good

7.2.2 Flooding

Foynes has a history of both coastal and fluvial flooding. There have been a number of recorded flood events in the town and surrounding area since 1995 including in:

- February 1995: During this flood event, a section of the N69 was flooded continuously for a number of days.
- February 2002: The combination of a high tide and storm surge contributed to the flooding of Foynes Harbour, the Railway line and a number of properties located along the Main Street. Due to the higher-than-normal tides, fluvial flood waters were prevented from being discharged into the Robertstown River and Shannon Estuary and hence the fluvial system became tidally locked. This resulted in the backing up in the streams that normally flowed through the village and discharged into the Shannon Estuary and Robertstown Channel.
- January 2005: The Corgrig Stream, overflowed and caused considerable damage to a number of dwellings and businesses.
- January 2014: The combination of heavy rainfall, gales and storm surge coinciding with high tide impacted approximately 25 residential properties and 7 commercial properties, comprising of both one and two storey properties located in Main Street and on the laneway between Main Street and the Railway line. It was also reported that 300m of the N69 was flooded. Approximately 300-500m of the intercity Railway line was flooded when flood waters from the Port area entered into the area.

- November 2017: The occurrence of heavy rain and flash flooding lead to serious flooding on the N69 at Mount Trenchard in the Foynes area, with several cars being trapped.

It is also important to note that some flood events reoccur in Foynes including frequent flooding along a stretch of the N69 / Horans Cross area as well as a section of Main Street. According to CFRAM River flood extents (present day), Foynes is at risk of flooding during the high probability (1 in 10 year) event. Flood waters from the River Robertstown flow out of the river during moderate flood events to the west along the old Foynes to Limerick railway line.

Foynes is also at risk of coastal flooding. A similar mechanism to river flooding is shown by CFRAM coastal flood extents (present day) during the high probability (1 in 10 year) event. More extensive flooding to the town and Foynes Port is likely during the medium (1 in 200 year) and low probability (1 in 1000 year), with large areas shown to be inundated by CFRAM coastal flood extents (present day).

7.3 Potential Impacts

7.3.1 Water Quality

It is possible that a negative impact on water quality and therefore the ecological and/or chemical status of the water bodies within the Lower Shannon Estuary and Foynes Harbour transitional water bodies may arise due to the marine SI works. The drilling of boreholes and removal of sediment from the seabed may introduce small amounts of sediment into the water column. The geographical extent of this impact would likely be limited mainly to the Marine Usage Licence Area however, currents and tides would ensure that the sediment is quickly dissipated and unlikely to represent a significant elevation above sediment levels normally associated with the ebb and flood tides. It is expected that the significance of impact will be short-term, and negligible in nature in the context of water quality and WFD Status and conditions will likely return to baseline after works are completed. The Marine SI works will not increase the risk of deterioration in the overall WFD Status of the Lower Shannon Estuary and Foynes Harbour transitional water bodies which are currently at high and good status (Table 7.2).

It is possible that accidental spills from plan equipment (e.g. jack up barge, tug and work vessels) may cause a negative impact on water quality and WFD Status. This impact would be unlikely if all mitigation measures were correctly implemented (see Section 7.4.1) and would likely be of short-term duration and conditions would likely return to baseline following completion of the works.

Overall, it has been determined that the sensitivity of the receptor is **High**, and the magnitude of the impact is considered to be **Medium**. Therefore, there is expected to be **Moderate** impacts.

However, it is expected that, with implementation of mitigation measures (as described in Section 7.4.1), the overall impact will be **Minor**.

7.3.2 Flooding

Due to the nature and scale of the proposed marine SI works, it is unlikely that there will be any impact on flood risk in the area.

Overall, it has been determined that the sensitivity of the receptor is **High due to the history of flooding and flood risk outlined in Section 7.2.2**, the magnitude of the impact is considered to be **Negligible,** therefore the significance of effect is minor.

7.4 Mitigation Measures

7.4.1 Water Quality

- Prior to entering the site all plant shall be cleaned and checked twice daily for leaks or drips.
- No plant is to be filled more than ¾ fill with fuel.
- Refuelling will take place, where possible, remote from the site and within suitable oil receptors.
- Any refuelling on site will take place at the Contractor's site compound.
- All oil / fuel at the compound will be adequately stored to ensure that any potential spill is contained and treated on site and that none can reach any drainage system or the River Shannon.
- A spill response kit will be available onsite and accessible to all to control pollution incidents. These spill kits will contain absorbent pads, absorbent granules and methods of disposal of materials and used kit. These kits will be located at appropriate points around the Site which are considered to be at a higher risk of pollution (e.g. refuelling area and next to fuel tanks). Further spill kits and supplies will be located in the stores within the Site, where replacements for used kits will be found.
- Spill kits will need be regularly inspected and immediately replaced if used.
- Toolbox talks will be communicated to Site staff and contractors so that they are fully informed of refuelling procedures.

7.4.2 Flooding

No mitigation measures recommended for flooding as the proposed works were deemed to only have a **Minor** impact.

8 BIODIVERSITY

8.1 Introduction

This chapter of the AIMU report identifies, describes and assesses the potential impacts and effects of the proposed development on biodiversity and has been completed in accordance with the guidance set out in Section 1.2.3. The following topics have been assessed in this chapter:

- Designated Sites
- Marine Habitats
- Marine Mammals
- Benthic Ecology

A separate document providing supporting information for Screening for Appropriate Assessment (SISAA) has been prepared and accompanies the maritime usage area license application for the Marine SI. This document is included in Appendix D.

8.2 Receiving Environment

8.2.1 Designated / European Sites

There are a number of sites designated for ecology or nature conservation interests within close proximity of the foreshore boundary where the Marine SI will be carried out. Table 8.1 shows designated sites within 15km of Foynes Island and lists the Qualifying Interests of each of these sites and distance and direction from Foynes Island. Figure 8.1 shows the locations of these designated sites in relation to the town and port of Foynes as well as Foynes Island.

It is possible that these sites may be impacted (directly or indirectly) by the proposed Marine SI works being carried out at Foynes Port and Foynes Island.

Table 8.1: Designated sites within 15km of the proposed works

Site Name	Qualifying Interests / Special Conservation Interests / Designation Criteria	Distance and Direction from Foynes Island
Lower River Shannon SAC	**Annex II Species:** • Freshwater Pearl Mussel • Sea Lamprey • Brook Lamprey • River Lamprey • Salmon • Common Bottlenose Dolphin **Annex I Habitats:** • Sandbanks which are slightly covered by seawater all the time • Estuaries • Mudflats and sandflats not covered by seawater • Coastal lagoons • Large shallow inlets and bays • Reefs • Perennial vegetation of stony banks • Vegetated sea cliffs of the Atlantic and Baltic coasts • Atlantic salt meadow	Located within the SAC

Site Name	Qualifying Interests / Special Conservation Interests / Designation Criteria	Distance and Direction from Foynes Island
	• Salicornia and other annuals colonising mud and sand • Watercourses of plain to montane levels with the *Ranuculion fuitantis* and *Callitricho-Batarchion* vegetation • Molina meadows on calcareous, peaty or clayey silt-laden soils • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	
River Shannon and Fergus Estuaries SPA	• Cormorant • Whooper swan • Light-bellied brent goose • Shelduck • Wigeon • Teal • Pintail • Shoveler • Scaup • Ringed plover • Grey plover • Lapwing • Knot • Dunlin • Black-tailed godwit • Curlew • Redshank • Greenshank • Black headed gull • Wetland and waterbirds	Located within the SAC
Barrigone SAC	• Common juniper on heaths or calcareous grasslands • Semi-natural dry grassland and scrubland facies on calcareous substrates • Limestone pavements • Marsh Fritillary	Approx. 4km SE
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	• Hen Harrier	Approx. 7km S
Moyreen Bog NHA	• Peatlands	Approx. 10km S
Askeaton Fen Complex SAC	• Alkaline fens • Calcareous fens	Approx. 11km SE
Carrigkerry Bogs NHA	• Peatlands	Approx. 13km S
Curraghchase Woods SAC	• Alluvial forests • *Taxus baccata* woods of the British Isles • Desmoulin's Whorl Snail • Lesser horseshoe bat	Approx. 15km E

In addition to the listed sites in the table above, there are a number of proposed Natural Heritage Areas (pNHAs) within 15km of the site. However, there is little available information on the qualifying criteria of these sites.

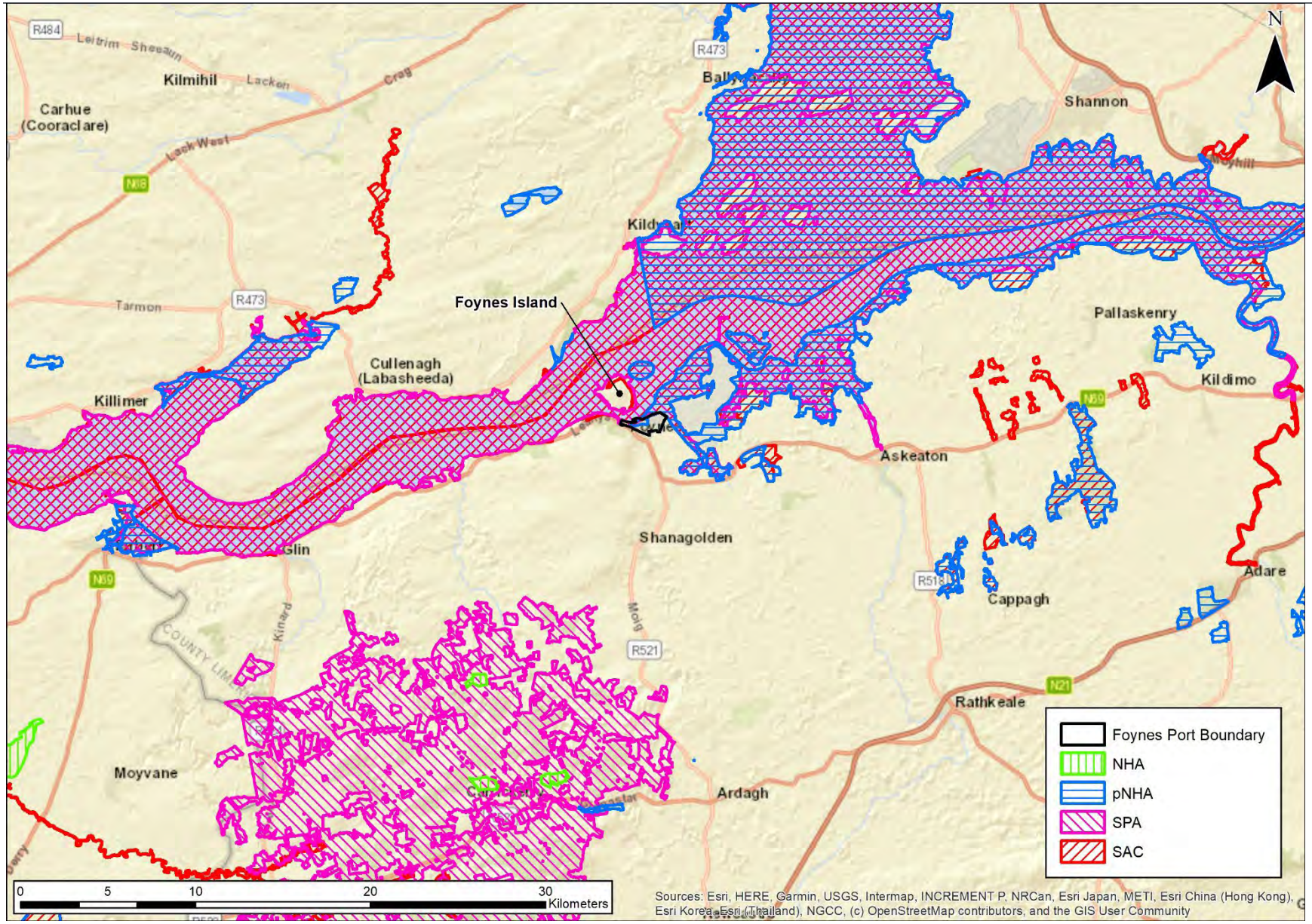

Figure 8.1: Designated Sites near Foynes

8.2.2 Marine Habitats

Annex I lists 233 European habitat types, including 71 priority (i.e. habitats in danger of disappearance). The Lower River Shannon SAC is designated for the Annex I qualifying interests of large shallow inlets and bays, estuaries, mudflats and sandflats not covered by seawater at low tide, sandbanks which are slightly covered by seawater all the time and reefs.

The River Shannon and River Fergus Estuaries SPA is designated for its wetland habitat area. This designation has been established to maintain the favourable conservation condition of this wetland habitat as a resource for regularly occurring migratory waterbirds that utilise it.

8.2.3 Marine Mammals

There have been a number of communities of marine mammals recorded in Shannon Estuary including common and bottlenose dolphin and grey and common seal.

An Annex IV Risk Assessment of the proposed site investigations was undertaken by the Irish Whale and Dolphin Group (IWDG) which includes more detailed information about numbers of Annex IV marine mammals and other species in the Shannon Estuary. A summary of this report can be found in **Error! Reference source not found.** Appendix C of this AIMU report.

8.2.3.1 Bottlenose Dolphin

The Shannon Estuary is one of the most extensively study sites for bottlenose dolphins in Europe. Bottlenose dolphins are found throughout the estuary, but regular concentrations occur off Kilcredaun Head in the outer estuary and Tarbert-Killimer which is associated with foraging behaviour. Most research and monitoring work has been carried out in the outer estuary as far upriver as Tarbert-Killimer with relatively less up-river of Tarbert.

Please see Appendix C of this AIMU report for further information on bottlenose dolphin numbers in the Shannon Estuary.

8.2.3.2 Common Dolphin

Common dolphins are frequently recorded off the western seaboard of Ireland with peak counts during summer, including off Loop and Kerry Heads. Historically, they are rarely encountered in the Shannon Estuary but recently the IWDG have recorded common dolphins during the winter as far upriver as Tarbert.

Please see Appendix C of this AIMU report for further information on common dolphin numbers in the Shannon Estuary.

8.2.3.3 Harbour Porpoise

Harbour porpoise are the most widespread and abundant cetacean in inshore Irish waters, with highest abundances in the Irish Sea. They are regularly reported at the mouth of the Shannon Estuary and occasionally within the outer estuary.

Please see Appendix C of this AIMU report for further information on harbour porpoise numbers in the Shannon Estuary.

8.2.3.4 Seals

Grey and harbour seals are distributed around the entire Irish coast with grey seals being more abundant along the western seaboard. Common and Grey seals are occasionally reported hauled out east of Foynes Island on Sturamis Island and Beeves Rock upriver of Foynes Port. Although both species only occur in small numbers these seals are part of a much wider population.

Please see Appendix C of this AIMU report for further information on seal numbers in the Shannon Estuary.

8.2.4 Benthic Ecology

The area immediately adjacent to the proposed quay contains exposed soft sediment mudflats which extend into the subtidal. The soft sediment area in this vicinity consists of both soft sediment intertidal and subtidal benthic communities as well as a sparse area of fucoid dominated intertidal reef community. The same communities are present at the landfall location of the bridge along the southern part of Foynes Island and both the intertidal and soft sediment communities are present in the area of the bridge landfall on the mainland to the south of the development location.

In summary, the following marine community types were found near to the proposed works:

- Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex;
- Subtidal sand to mixed sediment with *Nephtys* spp. community complex; and
- Fucoid dominated intertidal reef community complex.

8.3 Potential Impacts

8.3.1 Designated / European Sites

There is a possibility that the proposed marine SI works within the Shannon Estuary could directly negatively impact the Lower River Shannon SAC and the Shannon, the River Shannon and Fergus Estuaries SPA. This is because the works will take place within these designated sites. The drilling of boreholes has the potential to cause a significant or very significant impact within a small geographical area, altering baseline conditions. However, it is expected that any impacts will be temporary and reversible after works have been completed. It is unlikely that any major impacts will be experienced if appropriate mitigation measures are put in place.

A document providing Supporting Information for Screening for Appropriate Assessment (SISAA) has been prepared and is submitted with the application for a Marine Area Usage Licence.

From the findings of the Screening exercise, the possibility of Likely Significant Effects upon two of the European sites scoped into the appraisal cannot be excluded in the absence of further evaluation and analysis and quite likely the application of mitigation measures, as a result of the proposed project alone and in combination with the other projects considered.

- The possibility of likely significant Habitat Loss effects cannot be discounted for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA without further evaluation and analysis.
- The possibility of likely significant Water Quality and Habitat Deterioration effects cannot be discounted for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA without further evaluation and analysis.
- The possibility of likely significant Underwater Noise and Disturbance effects cannot be discounted for the Lower River Shannon SAC without further evaluation and analysis.
- The possibility of likely significant Aerial Noise and Visual Disturbance effects cannot be discounted for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA without further evaluation and analysis.

Having regard to the methodology employed and the findings of the screening stage exercise, it was concluded that an appropriate assessment of the implications of the proposed development on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA is required, in view of their conservation objectives and in combination with any other relevant plans or projects. A Natura Impact Statement (NIS) is being prepared for the Marine SI works.

8.3.2 Marine Mammals

Marine SI works carried out in the Shannon Estuary have the potential to negatively impact upon marine mammals in the area. Underwater noise due moving of plant equipment and drilling of boreholes as well as disruption of the seabed are expected to create significant impacts. Impacts are likely to occur over a relatively small geographical extent, mainly confined to the foreshore boundary, but may also impact areas in the immediate vicinity. However, any impacts are expected to be short term and will cease following completion of the SI works. In addition, overall effects are expected to be unlikely if mitigation measures are correctly implemented as outlined in the Annex IV Species Risk Assessment, Appendix C and Section 8.4.2.

8.3.3 Benthic Ecology / Marine Habitats

Marine SI works have the potential to negatively impact on the benthic ecology in the area. This is due to the fact that boreholes are required to be drilled on the seabed of the Shannon Estuary where there are a number of benthic habitats.

The benthic ecology and habitats will be affected through minor disturbance around the borehole location and sample stations and a very small volume of substratum loss, direct displacement or smothering during drilling. The small volumes of sediment displaced during the sampling may result in a thin layer of smothering however this deposited sediment will be quickly dispersed given the strong currents in the area (see Figure 19.2and Figure 19.3). The area of disturbance will back fill leaving no permanent significant loss or damage.

The sedimentary benthic habitats identified within the survey area are widespread and common for the region. Therefore, any disturbance is not expected to have an effect on the wider population of benthic fauna and the significance of any effect will be minor for sedimentary habitats.

Overall, it has been determined that the sensitivity of the receptor is **Medium**, however the magnitude of the impact is considered to be **Low**. Therefore, there is expected to be only **Minor** impacts.

8.4 Mitigation Measures

8.4.1 Designated Sites

From the findings of the Screening exercise, the possibility of Likely Significant Effects upon two of the European sites scoped into the appraisal cannot be excluded in the absence of further evaluation and analysis and quite likely the application of mitigation measures, as a result of the proposed project alone and in combination with the other projects considered.

The mitigation measures outlined for Marine mammals will be particularly relevant as will mitigation measures to ensure water quality is not significantly impacted. Full details of the proposed mitigation for designated sites will be determined following further evaluation and analysis in the Stage 2 Appropriate Assessment Process.

8.4.2 Marine Mammals

The following mitigation measures are recommended for marine mammals:

- The National Parks and Wildlife Service (NPWS) recommend a 500m radial distance sound source in water depths of <200m on commencement;
- NPWS's *'Guidance to Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters'* should be adhered to; and
- Statistic Acoustic Monitoring is recommended throughout marine SI and for a period after works are completed to ensure bottlenose dolphin activity at the site is not affected.

For further details of these measures, please refer to the Annex IV Species Risk Assessment, Appendix C.

8.4.3 Benthic Ecology / Marine Habitats

No mitigation measures recommended for Benthic Ecology/habitats as the proposed works were deemed to only have **Minor** impacts on benthic ecology and related receptors in the area.

9 FISHERIES & AQUACULTURE

This chapter of the AIMU report identifies, describes and assesses the potential impacts and effects of the proposed development on biodiversity and has been completed in accordance with the guidance set out in Section 1.2.3.

9.1 Receiving Environment

9.1.1 Designated Shellfish Waters and Aquaculture

The aim of the Shellfish Waters Directive is to protect or improve shellfish waters in order to support shellfish life and growth and is designed to protect oysters, mussels, cockles, scallops and clams.

While there are no designated shellfish waters located near the foreshore licence area, there are four designated shellfish waters located within the Shannon Estuary. These sites are designated under the Shellfish Water Directive and include:

- West Shannon Ballylongford;
- West Shannon Poulnasherry Bay;
- West Shannon Carrigaholt; and
- West Shannon Rinevella.

These sites are located 22, 27, 37 and 41 km to the west of the foreshore boundary of the proposed works. Figure 9.1 shows the locations of these designated shellfish waters.

In shallow waters to the east and west of the Marine Site Investigation areas shellfish aquaculture, including oysters and bottom grown mussels, is either on-going or under application. At its closest point the Marine SI will be approximately 800 metres from the edge of the Licensed area for Oysters to the west of Foynes Island (Figure 9.2).

9.1.2 Fish

The Shannon Estuary is one of the most important in Ireland as it is the gateway to the largest river catchment in the country. It coincides also with the Lower River Shannon SAC and has a diverse population of resident and migratory fish species.

The Lower River Shannon SAC has a diverse population of resident and migratory fish species, and its conservation objectives list the following aquatic species that could be encountered:

- Sea lamprey
- River lamprey
- Atlantic salmon

Another species, not specifically listed within the SAC supporting documentation but which is of conservation concern in its wider range is the European eel for which the Shannon and its tributaries is a recognised stronghold.

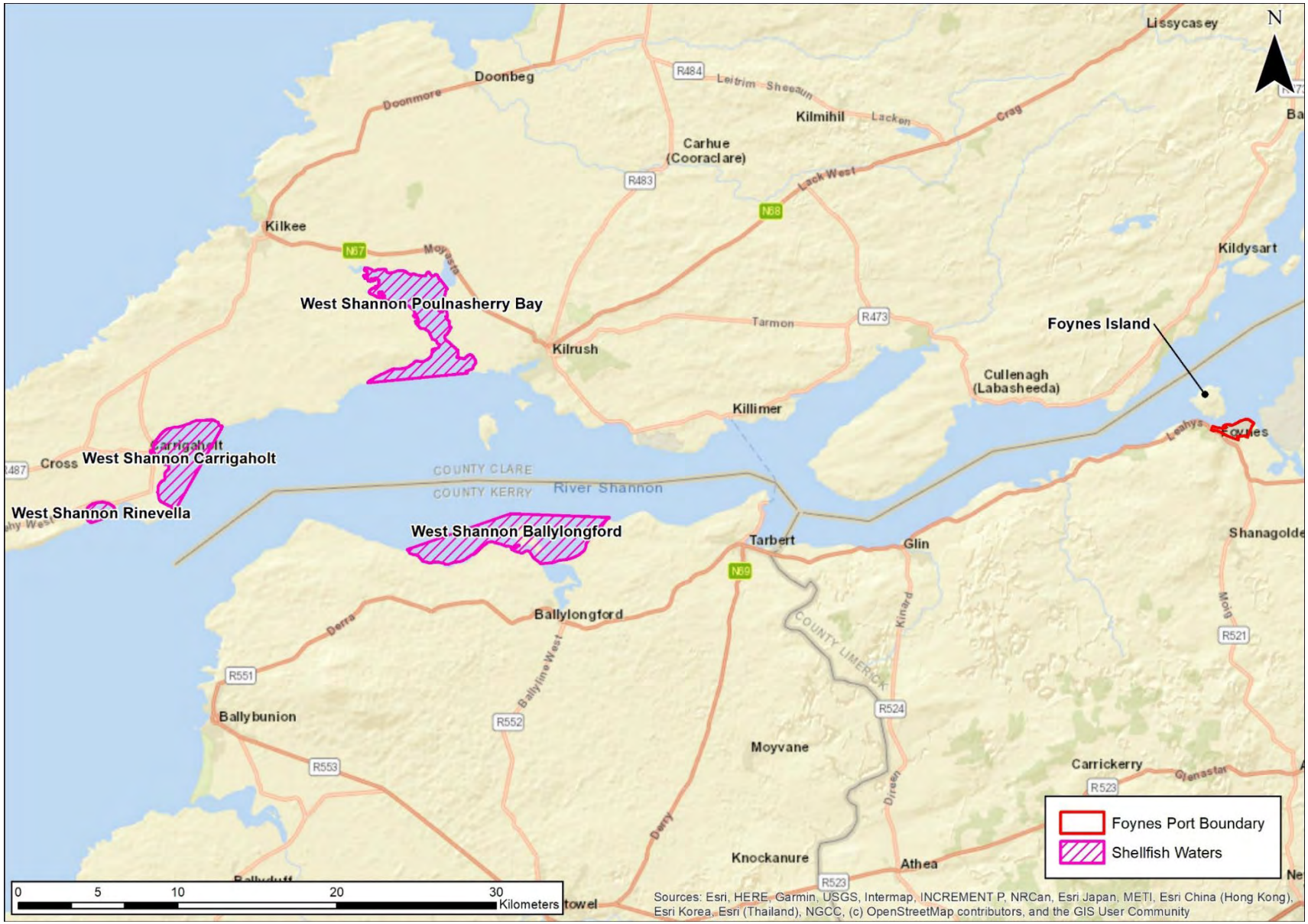

Figure 9.1: Map of shellfish waters near Foynes

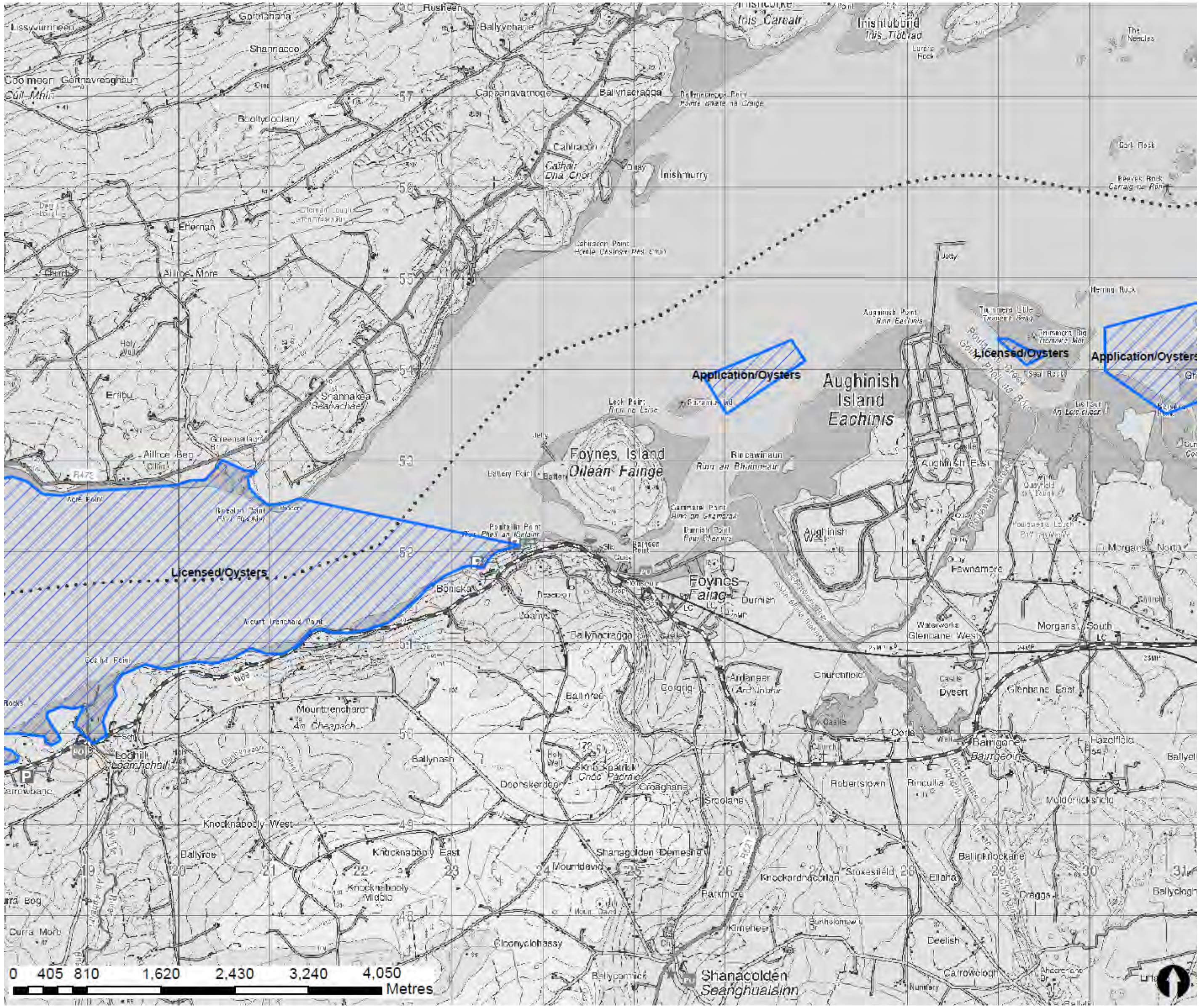

Figure 9.2: Aquaculture to the east and west of Foynes Island

Apart from the species of conservation importance listed in Section 8 the Shannon Estuary is temporary or permanent home to a wide range of marine and estuarine fish species which are currently not of conservation concern some of which have an economic value for the commercial fishing industry.

9.1.2.1 Atlantic Salmon

The Atlantic salmon is found in the Atlantic Ocean and in rivers around the Atlantic coasts of Europe and eastern North America. The Atlantic salmon is one of the most widespread fish in Ireland and is found in most of our rivers. Atlantic salmon are an emblematic species for Ireland and are extremely valuable for angling tourism. Their conservation status in Ireland is classified as vulnerable due to a decline in abundance, caused primarily by mortality at sea, habitat loss, barriers to migration, poor water quality, overfishing and sea lice.

Atlantic salmon are found within the River Shannon, Shannon Estuary and many tributaries including the River Fergus and River Deel. Table 9.1 shows estimates of adult salmon numbers compared to the Standing Scientific Committee's Conservation Limits (CL) for the Upper Shannon, Fergus and Deel from 2016 to 2021. This data has been taken from Inland Fisheries Ireland's (IFI) Status Reports of Irish salmon stocks. It should be noted that no information on the River Deel was available.

Table 9.1: Estimates of adult salmon numbers compared to Conservation Limits (CL) (2016-2021)

River	Year	Conservation Limit (CL)	Deficit / Surplus	Proportion CL Achieved
Upper Shannon	2016	49,638	-47,156	0.05
	2017	49,638	-47,156	0.05
	2018	49,638	-47,156	0.05
	2019	49,638	-47,156	0.05
	2020	49,638	-47,156	0.05
	2021	49,638	-47,156	0.05
Fergus	2016	1,188	-554	0.53
	2017	1,188	-834	0.30
	2018	1,187	-803	0.32
	2019	1,187	-748	0.37
	2020	1,187	-841	0.29
	2021	1,187	-798	0.33
Deel	2016	2,823	-	-
	2017	2,823	-	-
	2018	2,823	-	-
	2019	2,823	-	-
	2020	2,823	-	-
	2021	2,823	-	-

9.1.2.2 Lamprey

The Lower Shannon is a stronghold for both Sea lamprey (*Petromyzon marinus*) and River Lamprey (*Lampetra fluviatilis).* Sea lamprey are known to spawn in May-July in the lower River Shannon e.g., at Castleconnell and in the lower Mulkear River. River lampreys spawn in the same rivers in the spring and are also know from the Owenagarney River (Bunratty) and the Rine River both discharging to the upper Shannon Estuary.

As sea lamprey spawn in the Lower Shannon mainly from May to July they can be expected to migrate up the estuary in spring and early summer. River lamprey spawn in spring in March and April but their spawning migration tends to me much more extended than for sea lamprey stretching from autumn to spring.

There is an indication that sea lamprey are more likely to occur in sheltered areas, such as ports, river mouths and small inlets etc.

9.1.2.3 Eel

Eel are a protected species which are in serious decline throughout their Atlantic range for several decades.

The Shannon Estuary is one of the most important areas for eel and they are known to occur in all the main and many of the small tributaries.

9.1.2.4 Smelt

Smelt are found in estuaries and coastal waters along the Atlantic coast of Europe and northwards along the coast of Russia. In Ireland, the conservation status of smelt was long classified as vulnerable because they were only known from the Shannon Estuary, but surveys have confirmed that there are populations found in several other estuaries of large river systems around the island.

In a survey of the distribution of the species in the Shannon Estuary undertaken by salmon fishermen operating at the time, smelt were found to be most abundant in the upper estuary and in the Fergus Estuary, with none being taken around Foynes and only a few in the lower estuary in general.

9.2 Potential Impacts

9.2.1 Shellfish Waters and Aquaculture

It is not expected that there will be any impacts on shellfish waters or aquaculture due to the proposed works. This is due to the fact that designated shellfish waters and licensed aquaculture are located far from the Marine Usage Licence Area and the proposed works are relatively small and minor in scale. The drilling of boreholes and removal of sediment from the seabed may introduce small amounts of sediment into the water column. The geographical extent of this impact would likely be limited mainly to the Marine Usage Licence Area however, currents and tides would ensure that the sediment is quickly dissipated and unlikely to represent a significant elevation above sediment levels normally associated with the ebb and flood tides. It is expected that any the significance of impact will be short-term, and negligible in nature and conditions will likely return to baseline after works are completed.

It is possible that accidental spills from plan equipment (e.g., jack up barge, tug and work vessels) may cause a negative impact on water quality and therefore could impact on shellfish waters and aquaculture. This impact would be unlikely if all Water Quality mitigation measures were correctly implemented (see Section 7.4.1).

Overall, it has been determined that the sensitivity of the receptor is **High** given the presence of aquaculture within 1 kilometre of the proposed works and the location of Shellfish Waters downstream, albeit over 20 kms away, and the magnitude of the impact is considered to be **low,** given the temporary nature of the works, the

scale and the distance between the works and the shellfish waters and aquaculture areas. Therefore, there is expected to be **Minor** impacts.

However, it is expected that, with implementation of mitigation measures (as described in Section 7.4.1), the overall impact will be **Negligible**.

9.2.2 Fish

Marine SI works have the potential to negatively impact on fish in the area. This is due to the fact that boreholes are required to be drilled on the seabed of the Shannon Estuary where there are a number of protected fish species including Atlantic salmon, sea lamprey and river lamprey. There are also other key species that may be impacted including, eel and smelt, which, while not designated species under the Lower River Shannon SAC, are important in the overall biodiversity of the estuary. It is unlikely that significant impacts on these species will be experienced during the SI works within a relatively small geographical area, mainly confined to the foreshore licence area. These impacts may represent a change from the baseline conditions but are likely to be short-term and reversible after the works are completed.

Species, such as Atlantic salmon and sea and river lamprey have a lower sensitivity to sound as their swim bladder is located far from the ear (Popper et al 2014). The hearing of these species only involves particle motion and not sound pressure, and they are therefore less susceptible to impacts from geophysical survey. These species are susceptible to internal injury (barotrauma) from a rapid pressure change, i.e., unexploded ordnance detonation, which does not form part of the proposed site investigations (Popper et al 2014).

The geotechnical equipment typically operates at low frequencies (30 – 120 kHz) generally below the lower sound levels detected by fish. Geophysical and geotechnical equipment produce a wide range of frequencies and source levels. MacGillivray et al. (2014) used modelling to explore the acoustic effects of marine survey sound sources on marine mammals. They reviewed the acoustic signatures of widely used equipment. Sub-bottom profilers produced frequencies of 1-6 kHz at a source level of 200 dB re 1µPa @1m, while multibeam and side-scan sonar much higher frequencies of 200-230kHz at 218-229 dB re 1µPa @1m. Given that sound levels are unlikely to be audible to fish species and the activity will be temporary in any one location the magnitude of disturbance effects to fish resulting from the geotechnical surveys has been assessed as temporary and **Negligible**.

Overall, it has been determined that the sensitivity of the receptor is **High** given that Atlantic Salmon and Lamprey are qualifying interests of the Lower Shannon River SAC and fish are a contributing element to the ecological status of the Lower Shannon Estuary and Foynes Harbour water bodies. The magnitude of the impact is considered to be **Negligible**. Therefore, the significance of the impact is **Minor** and therefore not significant in EIA terms. The impacts on water quality and its interactions with fish will be similar to those outlined for Shellfish Waters and Aquaculture in Section 9.2.1. The same water quality mitigation measures will ensure the significance of the effect on fish is negligible

9.3 Mitigation Measures

9.3.1 Shellfish Waters

No specific mitigation measures are required for shellfish waters as the proposed works were deemed to only have **Negligible** impacts on shellfish waters aquaculture related receptors in the area with the water quality mitigation measures in place.

9.3.2 Fish

No specific mitigation measures are required for fish as the proposed works were deemed to only have **Negligible** to Minor impacts on fish and related receptors in the area.

10 AIR QUALITY

10.1 Introduction

This chapter of the AIMU report identifies, describes and assesses the potential impacts and effects of the proposed development on air quality in the receiving environment.

10.2 Receiving Environment

Under the Clean Air for Europe Directive, EU Member States must designate 'Zones' for the purpose of managing air quality. In Ireland, four zones were defined in the Air Quality Standards Regulations (2011) and the EPA reviews the zones regularly and amends them when necessary. The main areas defined in each zone are:

- **Zone A** – Dublin
- **Zone B** – Cork
- **Zone C** – Other large cities and towns
- **Zone D** – Rural Ireland

The proposed works are located in Air Zone D which is classified as air quality within the limits for measured ozone, nitrogen dioxide, oxides of nitrogen, sulphur dioxide, Particulate Matter (PM10& PM2.5), benzene, carbon monoxide, metals and polycyclic aromatic hydrocarbons (PAHs).

The Air Quality Index for Health (AQIH) is comprised of 6 regions as follows:

- Dublin;
- Cork;
- Large Towns (>15,000);
- Small Towns (5,000 – 15,000);
- Rural East; and
- Rural West.

The AQIH is calculated on an hourly basis using representative sampling from each region. Each region is ranked 1 – 10, with 1 being 'Good' and 10 being 'Very Poor' based on the worst-case pollutant in that region. The proposed works are located in the Rural West region and has an air quality index of 3 which is 'Good'

10.2.1 NO_2

Site specific baseline monitoring undertaken in January-April 2017 as part of the Capacity Extension at Shannon Foynes show levels less than the annual limit and WHO Guideline for the protection of human health (40ug/m3).

10.2.2 SO_2

The EPA carries out continuous monitoring for SO2 at a site located on raised ground on a farm near Askeaton in Co. Limerick which is located circa 5km east of Foynes. The results of the monitoring stations show levels

less than the limits and WHO Guidelines for the protection of human health and the wider environment for each of the annual, daily and hourly values.

10.2.3 Fine Particulate Matter ($PM_{2.5}$) and Coarse Particulate Matter (PM_{10})

The results recent monitoring in Foynes undertaken as part of the Capacity Extension at Shannon Foynes indicate that annual average PM10 and PM2.5 concentrations are well below the statutory limits for the protection of human health and also the more stringent WHO guidelines for air quality.

The EPA carries out continuous monitoring for PM10 and PM2.5 at a site located on raised ground on a farm near Askeaton in Co. Limerick which is located circa 5km east of Foynes. The results of the monitoring stations show levels less than the limits and WHO Guidelines for the protection of human health and the wider environment for each of the annual, daily and hourly values.

10.2.3.1 Total Particulate Matter (General Dust)

Shannon Foynes Port Company carries out a series of dust deposition monitoring in the area to characterise the impact of the operations and protect the wider environment. There are six dust monitors at the Foynes facility.

Although there are no statutory limits for dust deposition applicable to SFPC, in Ireland guidance on dust deposition defines nuisance levels dust at 350 mg/m^2 /d.

Generally, levels of dust deposition are well below the levels which would give rise to nuisance (and complaints). This is due largely to work undertaken by SFPC on restricting the generation of fugitive dust emissions, by restricting operations at certain berths during certain wind conditions.

10.3 Potential Impacts

The marine SI works are not expected to significantly impact upon air quality due to the fact that all works are relatively small in scale and limited plant machinery will be used.

Overall, it has been determined that the sensitivity of the receptor is **High,** given the proximity of the proposed works to Foynes and the good ambient air quality in the area. The magnitude of the impact is considered to be **Negligible** as the sources of emission to air will be limited to the plant and machinery required to undertake the Marine SI works as outlined in Section 2.3.4, jack up barge, tugboat and Department of Marine licensed survey vessel. The overall significance of effect is therefore considered to be Minor which is not significant in EIA terms.

10.4 Mitigation Measures

No mitigation measures recommended for landscape & visual as the effects of the proposed works are deemed to only have **Minor** significance on receptors in the area.

11 NOISE

This chapter of the AIMU report identifies, describes and assesses the potential impacts and effects of the proposed development on noise in the receiving environment.

11.1 Receiving Environment

11.1.1 Terrestrial Noise

Baseline noise monitoring was undertaken as part of the Capacity Extension at Shannon Foynes to determine the existing noise environment. The noise environment in the vicinity of the port is dominated by road traffic noise with contributions from various other industrial and human noise sources including the existing port activities.

Although there are no statutory emission limits applied to SFPC in respect of noise, the company operates a policy of testing all plant equipment noise sources (cargo handling equipment) annually to ascertain the sound power level of each piece of machinery.

Noise levels during daytime periods within the port itself are within the range 35 – 49dBA during daytime periods, and 32 – 49dBA night-time. Attenuation due to distance and other local screening has the effect of reducing these levels significantly beyond the port perimeter. Noise from the N69 also contributes to overall noise level at the port. Overall, port related noise recorded during the survey complied by SFPC with the EPA limit values.

11.1.2 Underwater Noise

The baseline environment is a section of a busy estuary. Therefore, existing underwater noise levels in the area are elevated in the presence of shipping traffic but noise attenuates quickly due to absorption by the mud on the seabed. From an underwater noise perspective, any sources of additional noise will be confined to an area close to the source and attenuate rapidly.

The site is noise sensitive due to the proximity of marine species including fish (e.g., Salmon, River Lamprey, Sea Lamprey, Eel, Smelt) and marine mammals (primarily the resident bottlenose dolphin population in the estuary). Otters may also be present in the area.

11.2 Potential Impacts

11.2.1 Terrestrial Noise

The marine SI works are not expected to impact upon terrestrial noise due to the fact that all works will be undertaken within the Shannon Estuary and adjacent to a busy Port, with boreholes being drilled on the seabed.

Overall, it has been determined that the sensitivity of the receptor is **High**, given the proximity of the proposed works to Foynes and the magnitude of the impact is considered to be **Negligible** as the sources of terrestrial noise emissions will be limited to the small number of plant and machinery required to undertake the Marine

SI works as outlined in Section 2.3.4, over a limited period of time. The overall significance of effect is therefore considered to be Minor which is not significant in EIA terms.

11.2.2 Underwater Noise

Underwater noise arising during the marine SI has the potential to impact on marine mammals and fish which are listed for protection under the EU Habitats Directive and Council Regulation. This is due to the use of various vessels and boring equipment used during the works.

The geotechnical equipment typically operates at low frequencies (30 – 120 kHz) generally below the lower sound levels detected by fish. MacGillivray et al. (2014) used modelling to explore the acoustic effects of marine survey sound sources on marine mammals. They reviewed the acoustic signatures of widely used equipment. Sub-bottom profilers produced frequencies of 1-6 kHz at a source level of 200 dB re 1µPa @1m, while multibeam and side-scan sonar much higher frequencies of 200-230kHz at 218-229 dB re 1µPa @1m.

Given that sound levels are unlikely to be audible to fish species and the activity will be temporary in any one location the disturbance effects to fish resulting from the geotechnical surveys has been assessed as temporary and **Not Significant**.

Overall, it has been determined that the sensitivity of the receptor is **High**, and the magnitude of the impact is considered to be **Medium**. Therefore, there is expected to be **Moderate** impacts.

However, it is expected that, with implementation of mitigation measures (as described in Section 11.3.2), the overall significance of the impact will be **Minor**.

11.3 Mitigation Measures

11.3.1 Terrestrial Noise

No mitigation measures recommended for terrestrial as the proposed works were deemed to only have **Negligible** impacts on receptors in the area.

11.3.2 Underwater Noise

The following mitigation measures are recommended for marine mammals:

- The National Parks and Wildlife Service (NPWS) recommend a 500m radial distance sound source in water depths of <200m on commencement;
- NPWS's *'Guidance to Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters'* should be adhered to; and
- Statistic Acoustic Monitoring is recommended throughout marine SI and for a period after works are completed to ensure bottlenose dolphin activity at the site is not affected.

For further details of these measures, please refer to the Annex IV Species Risk Assessment, Appendix C.

12 LANDSCAPE & SEASCAPE

12.1 Introduction

This chapter of the AIMU report identifies, describes and assesses the potential landscape and visual impacts and effects of the proposed works on the receiving environment.

12.2 Receiving Environment

12.2.1 Landscape Character Areas

The Limerick County Development Plan (2016) divides the county into ten different landscape types. These are:

- Agricultural Lowlands;
- Ballyhoura Slieve Reagh;
- Galtee Uplands;
- Knockfierna Hill;
- Lough Gur;
- Shannon Integrated Coastal Management Zone;
- Southern Uplands;
- Tory Hill;
- Slieve Felim Uplands; and
- Western Hills / Barnagh Gap / Sugar Hill.

The proposed works are located within the Shannon Integrated Coastal Management Zone (ICMZ). This landscape type comprises a large area of northern County Limerick and is bounded on one side by the Shannon Estuary while its southern boundary is defined by the gradually rising ground, which leads onto the agricultural zone and the western hills to the south-west. The presence of the estuary is the defining characteristic of the region. The landscape itself is generally that of an enclosed farm type, essentially that of a hedgerow dominant landscape.

12.2.2 Seascape Character Areas

The proposed works are also located within the Shannon Estuary and Tralee Bay Seascape Character Area (SCA). The area includes the Shannon Estuary, the mouth of the Shannon, Tralee Bay and extends offshore for 12 nautical miles. The coastline is diverse; the cliffs and coastline along the mouth of the Shannon include dramatic cliffs and sea stacks whilst the southern part of Tralee Bay at Mount Brandon is framed by cliffs and the second highest mountain in Ireland. This SCA includes numerous sites and features that attest to the extensive human interest and activity in the area. The wildlife and ecology of this area is particularly important, providing a range of habitats and features and connecting to the marine waters and continental shelf. This area includes a distinct population of Bottlenose dolphins and the inlets, mudflats, tidal habitats and islands of the estuary, as well as sea stacks and cliffs offer habitat for a wide range of seabirds and wintering birds.

12.2.3 Foynes Town

Foynes town is a significant feature in the local landscape. This is a model estate town with historic associations to trans-Atlantic transportation in the 19th and 20th Century. Today there is a growing tourist industry linked with this history, although the town continues to be recognised mainly for its Port facilities which are a core asset for the economic development of the region. The civic and domestic part of the village is centred on Main Street - south of the Port. Main Street is bound on both sides by a mix of residential, commercial and civic buildings. Although designs are varied in style, there are a number of attractive stone buildings and terraces which undoubtedly contribute to the area's conservation designation.

12.2.4 Foynes Port

The landscape within Foynes port is industrial, mainly being associated with port activities. This industry has grown significantly in modern times allowing Foynes to become one of the most important ports along the western coastline of Ireland. This is exhibited visually by the large ships and boats that use the port as well as by the support services necessary for the port - housed in large industrial style units. The harbour has a busy appearance constantly on the move. Tall mast lighting and cranes are prominent and visible from the wider landscape. A large number of HGV's and transport containers use the port and are visually prominent on local roads. Commercial and industrial buildings related to the Port extend: east towards the N69; west as far as the confluence of the Shannon and Robertstown Rivers; and south as far as the railway line.

12.2.5 Nature and Recreation

The Wild Atlantic Way is a 2,600km driving route along the Irish west coast running from the Inishowen Peninsula in the north to the town of Kinsale, County Cork, in the south. Foynes is located on the main route of the Wild Atlantic Way and the Foynes Island Viewpoint is a discovery point. Foynes also contains recreational areas including Foynes Woodland, a 17acre woodland area with various paths and offering views over the Shannon Estuary. There are also a number of scenic views in Foynes and along the Shannon Estuary Way.

12.3 Potential Impacts

There will be a short-term impact of the presence of marine plant while the SI works are being carried out. This impact will be temporary in duration and will be undertaken in areas of a busy Port and existing jetty on the seaward side of Foynes Island. The marine SI works are not expected to have any permanent impact on the landscape and visual aspects of the surrounding area. This is because works are being undertaken on the seabed of the Shannon Estuary. Overall, it has been determined that the sensitivity of the receptor is **High,** given the nature conservation, recreational and seascape character. The magnitude of the impact is considered to be **Negligible** given the nature of the works and the short duration**,** therefore the significance of the effect is Minor.

12.4 Mitigation Measures

No mitigation measures recommended for landscape & visual as the effects of the proposed works are deemed to only have **Minor significance** on receptors in the area.

13 TRAFFIC & TRANSPORT (INCLUDING NAVIGATION)

13.1 Introduction

13.1.1 Overview of Foynes Port

Foynes Port is part of Shannon Foynes Port Company's operations within the Shannon Estuary. Other facilities are located at Moneypoint, Tarbert, Augninish, Shannon Airport and Limerick Dock. Overall, Foynes Port is 90 hectares in area, with a further 76 hectares zoned for future development.

As the principal deep-water general cargo facility, Foynes Port caters for vessels of up to 225m in length with a draft of 10.5m. The port is close to all major transport arteries. Shore-side operations at Foynes Port are serviced by modern cranage and handling systems, backed up by state-of-the-art tugs and ancillary services.

Foynes specialises in dry, liquid and break-bulk cargoes as well as special projects and heavy lifts. It has around 30,000m^2 of bulk warehousing within the port area, as well as extensive liquid storage capacity.

13.1.2 Existing Safety Procedures

Shannon Foynes Port Company (SFPC) have outlined a 5 Phase Incident Management Process. The phases are as follows:

- Phase 1 – Discovery, Notification and Mobilisation;
- Phase 2 – Development of Action Plan;
- Phase 3 – Response Plan Implementation;
- Phase 4 – Response Termination and Demobilisation; and
- Phase 5 – Post Incident Operations (documentation of cost / litigation).

SFPC have also laid out a Marine Emergency Plan for the Shannon Estuary as follows:

- Outlines initial action, roles and responsibilities of the Harbour Master and other SFPC personnel prior to the arrival of external emergency services
- Defines a process to facilitate incident notification and effective and coordinated communications
- Sets out initial procedures for identifying major incident scenarios.

In terms of onshore emergencies, SFPC have developed an Onshore Emergency Response Plan. The plan sets out what actions are to be taken in the event of an emergency at SFPC premises and has been developed with inherent flexibility to allow alterations to deal with unlikely consequences. The main objectives of the plan are to:

- Prevent an escalation of the emergency;
- Save life;
- Relieve suffering;

- Protect the environment;
- Protect property; and
- Restore normality as soon as possible.

13.2 Receiving Environment

13.2.1 Traffic & Transport

In terms of road transport links, the N69 road passes through the town. The N69 is a national secondary road in Ireland and runs from Limerick to Tralee. There are plans to substantially upgrade the road network to Foynes from Limerick in terms of the proposed new road. An Bord Pleanála approved the Foynes to Limerick Road (including Adare Bypass) on 30th August 2022. The project is 35km in length and will connect the Core Port of Foynes to the motorway network near Limerick.

Currently, there are no rail links to Foynes as the existing railway line was discontinued in 2000. However, following €800,000 funding from the EU Infrastructure (TEN-T) Connecting Europe was secured by Shannon Foynes Port Company works are currently underway to reinstate the 40km line from the port to Limerick.

Foynes is well connected by bus services all year round to towns and cities including Limerick and Tralee.

There are currently no passenger ferries operating out of Foynes Port.

13.2.2 Navigation

According to the EMODnet Vessel Density Map, passenger vehicle densities around Foynes Port and Foynes Island are high. Cargo and Tanker Vessel Density maps also show a high density of vessels operating around Foynes Port and Foynes Island. In terms of sailing activity, mapping shows that there is no significant sailing vessel density in the area.

13.3 Potential Impacts

13.3.1 Traffic & Transport

Due to the marine SI works being carried out within the Shannon Estuary, it is unlikely that any major impacts on traffic and transportation will be experienced. This is because there are no passenger ferry services operating out of Foynes Port and the traffic associated with works will be limited to the mobilisation of the typical plant to the site. In some cases plant will be mobilised by sea.

Overall, it has been determined that the sensitivity of the receptor is **Negligible**, and the magnitude of the impact is considered to be **Negligible,** therefore the significance of effect is negligible.

13.3.2 Navigation

It is possible that impacts on shipping and navigation could occur during the marine SI works. This is because work will be carried out within the Shannon Estuary, near Foynes Port, a busy commercial and industrial port. Impacts could range from disruption to port activities to a major shipping accident. It is expected that any

impacts will represent a change from baseline conditions in the area, however it is expected that, following the successful implementation of mitigation measures, impacts on shipping and navigation will be unlikely overall.

Overall, it has been determined that the sensitivity of receptors is **High**, and the magnitude of the impact is considered to be **Medium**. Therefore, there is expected to be **Moderate** impacts.

However, it is expected that, with implementation of mitigation measures (as described in Section **Error! Reference source not found.**), the overall impact will be **Minor**.

13.4 Mitigation Measures

13.4.1 Traffic & Transport

No mitigation measures recommended for traffic & transport quality as the proposed works were deemed to only have **Negligible** impacts on receptors in the area.

13.4.2 Navigation

A Marine Notice will be issued in advance of any marine SI works taking place so as all mariners operating in the area are aware of the operations. In addition, the Marine SI Contractor will have all the necessary health and safety procedures in place which will include cognisance of maritime safety.

14 ARCHAEOLOGY & CULTURAL HERITAGE

14.1 Introduction

This section of the AIMU report identifies, describes and assesses the potential impacts and effects of the proposed works on archaeology and cultural heritage and has been completed in accordance with guidance set out in Section **Error! Reference source not found.**.

Appendix E includes a detailed Archaeological Impact Assessment (AIA) Report prepared by ADCO Ltd. This includes additional information on the receiving environment, potential impacts of the proposed works and mitigation measures.

14.2 Receiving Environment

14.2.1 Shannon Estuary

The inter-tidal environment of the Shannon Estuary provides for a rich archaeological holding content. Archaeological / palaeo-environmental evidence of Mesolithic, Neolithic, Bronze Age and post-medieval date has been recovered from the Shannon. Large sections of the estuary provide suitable environmental conditions for the preservation of archaeological material along its intertidal zone, where deep deposits of estuarine mud provide an anaerobic environment within which archaeological material is preserved. It should also be noted that there is a National Inventory of Architectural Heritage site located within the townland of Corgrig, on the western edge of Foynes Port which is deemed to be a harbour of regional importance.

Research conducted in the 1990s highlighted the archaeological importance of the Shannon estuary since earliest times. The work focused attention upon the role that the estuary played in providing economic potential in terms of coastal exploitation for fishing and communications since the later Mesolithic period. The study area was concentrated on the intertidal mudflats on the Fergus and Meelick rivers, and around Carrigdirty, Co. Limerick (upriver from the present survey area).

While the distribution of known medieval and early modern / nineteenth-century fortifications along the estuary was well known, research has brought attention to the archaeological potential of the larger estuary area.

14.2.2 Foynes Port / Island

The Port of Foynes dates back to 1846 with the construction of a masonry quay and associated breakwater. Improvement and expansion works were carried out throughout the late 19th and much of the 20th century, with capacity for larger vessels added in 1933 and the existing east quay added in 1968, being further extended in 1984. These developments required the reclamation of large areas of the foreshore.

The existing archaeological record demonstrates a high potential on Foynes Island, with a list of known sites on the island. This raises the risk for further archaeological observation that could be exposed during new construction projects. The foreshore area should be regarded as retaining high potential in this regard.

There are a number of features of cultural and archaeological significance in the area which are listed in the Record of Protected Structures (RPS), National Monuments Service (NMS), the NIAH and the National Museum of Ireland databases.

On Foynes Island the RPS record a Victorian period house which is located in close proximity to the proposed bridge. The NMS record a Napoleonic era gun battery, which was thought to be under construction between 1794 and 1795, on the west coast of the island. It is described as being an earthwork battery which would have held six 24-pound cannons. The site of this battery is now overgrown with vegetation. Furthermore, the NMS record six Fulacht Fiadh sites (ancient cooking places) located across the island. The NMS Wreck Viewer also shows a metal wreck of unknown origin located on the western shoreline.

14.2.3 Foynes Town

Today Foynes forms a linear settlement with the continuation of house-building along much of the N69 and new housing developments established on the south side of the conurbation.

While there is a lack of archaeological sites in Foynes, there are a number of features recorded by the RPS and the NIAH. The most notable feature is Foynes Railway Station, as recorded by NIAH, which is of regional importance. This site includes the railway station building, a cast-iron water tower and a signal box.

It is also important to note that Foynes and the foreshore boundary is not located within or near to any Architectural Conservation Areas.

14.2.4 Summary

The current assessment indicates the presence of a range of prehistoric and more recent archaeological sites within the wider area at Foynes. In addition, a number of fish weir/traps are present on the OS historic Maps for the areas under assessment. Moreover, the existing archaeological record demonstrates a high potential for Foynes Island, with a list of known sites located upon the island. As a result, the surrounding foreshore/intertidal areas should be regarded as retaining a high potential.

14.3 Potential Impacts

Primary impacts will arise from the boreholes themselves, with secondary impacts relating to positioning of the works-platform (jack-up barge); where the spud-legs make contact with the riverbed / foreshore. There are no impacts to known cultural heritage sites arising from the proposed Marine SI works.

Overall, it has been determined that the sensitivity of the receptors is **High** as outlined in Section 14.2.4, and the magnitude of the impact is considered to be **Medium** for archaeology and **Negligible** for cultural heritage. Therefore, any impacts on cultural heritage and archaeology are expected to be **Moderate**.

However, it is expected that, with implementation of mitigation measures (as described in Section 14.4), the overall impact will be **Minor**.

14.4 Mitigation Measures

Table 14.1, taken from the Archaeological Impact Assessment (Appendix E), summarises the potential impacts and proposed mitigation.

Table 14.1 Archaeological mitigation arising from impacts identified

Site/ Area	Potential Impacts	Archaeological Mitigation
Marine SI within Foreshore Boundary at Deepwater Terminal location.	• No impact to known cultural heritage sites. • Potential, direct, negative impact to any unrecorded archaeological deposits or structures buried within the foreshore/riverbed.	• Marine Geophysical Data review to identify any features/anomalies of archaeological potential. • Pre-disturbance underwater/intertidal inspection of any features/anomalies deemed to be of archaeological interest. • Where features of archaeological/historic significance are positively identified, avoidance of those features is recommended. • Archaeological Monitoring of the SI works.
Marine SI within the Foreshore Boundary at the Road-Bridge location.	• No impact to known cultural heritage sites. • Potential, direct, negative impact to any unrecorded archaeological deposits or structures buried within the foreshore/riverbed.	• Marine Geophysical Data review to identify any features/anomalies of archaeological potential. • Pre-disturbance underwater/intertidal inspection of any features/anomalies deemed to be of archaeological interest. • Where features of archaeological/historic significance are positively identified, avoidance of those features is recommended. • Archaeological Monitoring of the SI works.

For further details of these measures, please refer to Appendix E.

14.4.1 Pre-Disturbance Measures

An archaeological survey and assessment of the terrestrial, intertidal, and underwater areas associated with proposed Foynes Island Deepwater Terminal project will be carried out. This will include underwater inspection of any anomalies / features of archaeological interest arising from the Marine Geophysical Survey. In the event that features of archaeological / historic significance are encountered as part of the inspections, avoidance of those features will be recommended.

14.4.2 During Marine SI Works

Archaeological Monitoring of the Marine Site Investigation is recommended. This will be carried out by experienced maritime personnel (licence eligible), monitoring all riverbed / intertidal disturbances arising from the proposed SI works. No seabed disturbances will be permitted to take place unless an archaeologist is present to monitor the operation.

14.4.3 Management Measures

The following management measures are recommended for archaeological mitigation:

- Archaeological monitoring – In accordance with the terms of Section 5 of the National Monuments Act (2004 Amendment) is recommended;
- Time scale for the Marine SI should be made available to the archaeologist with sufficient notice provided;
- Licence applications should be in place in advance of the SI works commencing;

- Sufficient notice should be given to the archaeologist/s in advance of the SI works commencing. This will allow for prompt arrival on site to monitor the ground disturbances;
- Discovery of archaeological material – In the event of archaeological features or material being uncovered during the Marine SI works, the geotechnical works should cease in the immediate area to allow the archaeologist to inspect any such material;
- Archaeological material – Once the presence of archaeologically significant material is established, full archaeological recording of such material may be warranted;
- Archaeological team – It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation;
- Secure site offices and facilities should be provided on or near those sites where excavation is required; and
- Adequate funding to cover excavation, post-excavation analysis, and any testing or conservation work required should be made available.

15 POPULATION & HUMAN HEALTH

15.1 Introduction

This chapter of the AIMU report identifies, describes and assesses the potential impacts and effects of the proposed development on population and human health and has been completed in accordance with the guidance set out in Section **Error! Reference source not found.**.

One of the principal concerns in the development process is that individuals or communities, should experience no significant diminution in their quality of life from the direct or indirect effects arising from the proposed works. Ultimately, all the impacts of the proposed works have the potential to impinge on human health, directly and indirectly, positively and negatively. The key issues examined in this chapter of the AIMU report include population, human health, land-use, residential amenity, community facilities and services, tourism, noise and health and safety.

15.2 Receiving Environment

The proposed works are not located within any townlands however, the foreshore boundary does run up to the shoreline at Foynes Port, located within Corgrig townland, and Foynes Island, located within Foynes Island townland. The foreshore boundary on the Foynes Port shoreline is located approximately 650m north-east of the town of Foynes and approximately 30km west of the city of Limerick. Please refer to Chapter 3 for more information on the location of the proposed works.

15.2.1 Settlement & Land Use

The geographic extent of the proposed works is located on the sea floor in the Shannon Estuary with the foreshore boundary running up to the shoreline at Foynes Port and Foynes Island. None of the proposed Marine SI works will take place on land.

Foynes town is relatively small, with a population of approximately 520 people (as of 2016 census), a 4.2% decrease since 2011. The town is dominated by Foynes Port and associated marine related industry, with little residential or recreational uses apparent. The deep-water seaport is nationally significant as it is the third largest seaport in Ireland after Dublin Port and Cork Port.

While Foynes is a relatively new town, dating from the mid-1900s, it has a rich maritime and aviation history. Foynes has a Flying Boat Museum which hosts a replica of the B314 flying boat, a famous plane which made transatlantic flights in the 1930’s and 1940’s.

The area surrounding Foynes has a number of major industry sites and major employers. These include major multinationals as well as Irish businesses operating in the food, electronics and commodities sectors.

15.2.2 Education

The nearest primary school to the proposed works is St Senan’s National School, which lies approximately 900m south-west of the proposed works within the town of Foynes. There are no secondary schools, colleges or universities near to the area of the proposed works.

15.2.3 Access & Public Transport

In terms of road transport links, the N69 road passes through the town. The N69 is a national secondary road in Ireland and runs from Limerick to Tralee. There are plans to substantially upgrade the road network to Foynes from Limerick in terms of the proposed new road. An Bord Pleanála approved the Foynes to Limerick Road (including Adare Bypass) on 30th August 2022. The project is 35km in length and will connect the Core Port of Foynes to the motorway network near Limerick.

Currently, there are no rail links to Foynes as the existing railway line was discontinued in 2000. However, following €800,000 funding from the EU Trans – European Transport Network (TEN-T) was secured by Shannon Foynes Port Company works are currently underway to reinstate the 40km line from the port to Limerick.

Foynes is well connected by bus services all year round to towns and cities including Limerick and Tralee.

There are currently no passenger ferries operating out of Foynes Port.

15.2.4 Amenities & Community Facilities

There are a number of amenities and community facilities within the town of Foynes including:

- Foynes Yacht Club;
- Foynes Harbour Viewing Point;
- Foynes Flying Boat & Maritime Museum;
- Foynes & District Community Centre;
- An Post Foynes;
- St Senan's Roman Catholic Chapel;
- Foynes Garda Station;
- Foynes Library;
- St Senan's GAA Club; and
- A medical centre and pharmacy.

The only one of these amenities likely to be impacted indirectly by the proposed works is the Foynes Yacht Club whose members regularly use the Shannon Estuary for sailing and leisure pursuits.

15.2.5 Tourism

Tourism in County Limerick generated an annual revenue of over €307 million, with 931,000 visitors in 2017. Limerick was the sixth most popular county in Ireland for overseas visitors in 2017. In terms of domestic visitors, Limerick attracted 284,000 trips by Irish residents in 2017, falling significantly short of the performance of its counterparts along the western seaboard.

In the town of Foynes, the main attraction is the Foynes Flying Boat Museum, which attracted over 50,000 visitors in 2017. This is the only aviation museum in Ireland and the only flying boat museum in the world. The museum also hosts the annual Foynes Air Show.

Foynes is also located on the Wild Atlantic Way, with Foynes Island Viewpoint being designated as a Discovery Point. Further recreational areas include Foynes Woodland which is a 17acre area of woodland located on the banks of the Shannon Estuary offering pathways and viewpoints over the estuary.

15.2.6 Human Health

The baseline health and wellbeing of the population in the town of Foynes is shown by the Census of Ireland 2016 results. Of the total population of 946 in the Shanagolden electoral division, 15 people stated that their health was either bad or very bad in 2016. This represents 1.6% of the population.

In the same electoral division, 30.4% of the population were aged between 0 and 14 and 33.6% were aged over 65. The average age in Foynes is 40.4 and 52% of residents are over 40 years old.

15.3 Potential Impacts

15.3.1 Settlement & Land Use

Due to the fact that the marine SI works will take place within the Shannon Estuary, it is anticipated that there will be no impact on Settlement & Land Use in the area. Whilst the sensitivity of the receptors is **High,** given the proximity of the works to Foynes, the magnitude of impacts is also **Negligible**. Therefore, the significance of the effect is considered to be **Negligible**.

15.3.2 Education

Due to the fact that the marine SI works will take place within the Shannon Estuary, it is anticipated that there will be no impact on Education within the town of Foynes and surrounding area. Therefore, the sensitivity of the receptors is **High,** and the magnitude of impacts is also **Negligible**. Therefore, the significance of the effect is considered to be Negligible.

15.3.3 Access & Public Transport

Due to the fact that the marine SI works will take place within the Shannon Estuary and there are no passenger ferry services operating out of Foynes Port, it is anticipated that there will be no impact on Access & Public Transport in the area. Therefore, the sensitivity of the receptors is **Negligible,** and the magnitude of impacts is also **Negligible**. Therefore, the significance of the effect is considered to be Negligible.

15.3.4 Amenities & Community Facilities

Due to the fact that the marine SI works will take place within the Shannon Estuary, it is anticipated that there will be no impact on Amenities & Community Facilities within the town of Foynes and surrounding area. Therefore, whilst the sensitivity of the receptors is **High,** and the magnitude of impacts is also **Negligible**. Therefore the significance of the effect is considered to be Negligible.

15.3.5 Tourism

Due to the fact that the marine SI works will take place within the Shannon Estuary, it is anticipated that there will be limited impact on Tourism within the town of Foynes, however sailing and recreational tourism in the Estuary could be affected. Therefore, the sensitivity of the receptors is **High,** and the magnitude of impacts is also **Low**. Therefore, the significance of the effect is considered to be **Minor** particularly when the mitigation under Navigation (Section 13.4.2) is considered, i.e., a Marine Notice will be issued in advance of any marine SI works taking place so as all mariners operating in the area are aware of the operations. In addition, the Marine SI Contractor will have all the necessary health and safety procedures in place which will include cognisance of maritime safety.

15.3.6 Human Health

Due to the fact that the marine SI works will take place within the Shannon Estuary, it is anticipated that there will be no impact on the health of residents within the town of Foynes and surrounding area given the limited impacts on air quality, noise, water quality, waste, climate and transportation. Therefore, whilst the sensitivity of the receptors is **High,** and the magnitude of impacts is also **Negligible**. Therefore, the significance of the effect is considered to be **Negligible**.

15.4 Mitigation Measures

No mitigation measures recommended for Population and Human Health as the proposed works were deemed to only have **Negligible to Minor** impacts on Population and Human Health and related receptors in the area.

16 MAJOR ACCIDENTS & DISASTERS

16.1 Introduction

This chapter of the AIMU report identifies, describes and assesses the potential impacts and effects of the proposed development on major accidents & disasters in the receiving environment. The following topics are explored:

- COMAH Establishments; and
- Natural Events.

16.2 Receiving Environment

16.2.1 COMAH Establishments

The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations, 2015 (the COMAH regulations) lay down the rules for the prevention of major accidents involving dangerous substances and seek to limit, to the greatest practicable extent, the consequences for human health and the environment of such accidents. The overall objective is to provide a high level of protection in a consistent and effective manner.

This is achieved through tiered controls on the operators of those establishments that are subject to the Regulations: the controls are more onerous where the quantities of dangerous substances present are greater.

There are two tiers of establishment, which are related to the quantities of dangerous substances present. Depending on quantity, an establishment may be upper-tier or lower-tier. Upper-tier establishments have greater quantities of dangerous substances present and therefore are obliged to comply with additional requirements specified in the Regulations.

The foreshore area where marine SI works are proposed is in close proximity to two establishments that fall within the scope of the COMAH regulations including:

- Atlantic Fuel Supply Company Ltd. (Upper Tier); and
- Exolum Shannon Ltd. (Lower Tier).

16.2.2 Natural Events

There are risks other than from COMAH establishments that may impact on the proposed works, including natural events that may cause or exacerbate a major accident at a COMAH establishment, which may in turn impact on the proposed works. These include the following:

- Flooding; and
- Severe Weather.

16.2.3 Other external events

There is also a risk of other external events that may impact on the proposed works that may cause or exacerbate a major accident at a COMAH establishment, which may in turn impact on the proposed works. These include the following:

- Utilities failure;
- Maritime Disasters; and
- Industrial Accidents (e.g., oil and gas refinery storage, Manufacturing industry etc.).

16.3 Potential Impacts

It is possible that a major accident and/or disaster could occur during the marine SI works. This is because work will be carried out within the Shannon Estuary, near Foynes Port, a busy commercial and industrial port. A range of accidents and disasters could take place including:

- Injury and/or death of staff undertaking the marine SI;
- Injury and/or death of port staff or crew of ship;
- Collision of sampling vessels and other vessels;
- Sampling vessels running aground; and
- Striking or disruption of utilities (e.g., gas mains, electricity cables, water mains) under the seabed during borehole drilling.

It is unlikely that these events would take place if appropriate planning, mitigation and safety procedures are implemented (see Section **Error! Reference source not found.**). Furthermore, it is important that effective communication between sampling staff, port staff and ship operators is prioritised to ensure safety at all times during the SI works.

Overall, it has been determined that the sensitivity of the receptor is **Medium**, and the magnitude of the impact is considered to be **Medium**. Therefore, there is expected to be **Moderate** impacts.

However, it is expected that, with implementation of mitigation measures (as described in Section 16.4), the overall impact will be **Minor**.

16.4 Mitigation Measures

A Marine Notice will be issued in advance of any marine SI works taking place so as all mariners operating in the area are aware of the operations. IN addition, the Marine SI Contractor will have all the necessary health and safety procedures in place which will include cognisance of maritime safety.

17 CLIMATE

The Climate Action Plan (CAP) 2023 sets out the Government of Irelands ongoing, urgent response to the climate crisis. The impacts and risks of climate change are becoming more complex and harder to manage. These impacts will be felt by all, but they won't affect everyone equally. In Ireland, these impacts have been experienced, particularly through floods and storms, and the damage they have caused. The Government of Ireland are making steady progress on their climate goals, but events like these, and their expected increase in frequency and intensity, highlight that they must work even harder to ensure the country can cope with the ongoing effects of climate change.

The CAP details the following six vital high impact sectors and their aims to reduce emissions:

- Powering renewables: 75% reduction in emissions by 2030;
- Building better: 45% reduction in commercial/public and 40% reduction in residential emissions by 2030;
- Transforming how we travel: 50% reduction in emissions by 2030;
- Making family farms more sustainable: 25% reduction in emissions by 2030;
- Greening business and enterprise: 35% reduction in emissions by 2030; and
- Changing our land use: exact reduction targets for this sector is yet to be determined.

The Marine SI works will not have any significant emissions that would have a significant impact on the local climate. The machinery will be restricted to the jack up barge with cable percussive and rotary boring and the survey vessels required for the geophysical and environmental sampling. There are no permanent structures or emissions from the Marine SI and the use of natural resources and energy will be restricted to the powering of the marine plant for the site investigations which will be fit for purpose and subject to the following best practice measures:

- Ensuring exhaust emissions are maintained to comply with the appropriate manufacturer's limits (emissions to air controlled); and
- Turning off engines when not in use for more than five minutes. This restriction will be enforced strictly unless the idle function is necessary for security or functionality reasons; and
- Regular maintenance of plant and equipment. Technical inspection of vehicles to ensure they will perform the most efficiently.

The ultimate goal of the Marine SI is to inform the design of the main Deepwater Berth Development which will be used to support the offshore renewable energy industry and facilitate the achievement of one of the keys aims of the CAP 2023, i.e. to climate change mitigation and adaptation, including by reducing greenhouse gas emission and enhancing carbon sequestration, as well as promote sustainable energy.

18 WASTE

18.1 Introduction

This chapter of the AIMU report identifies, describes and assesses the potential impacts and effects of waste generated from the proposed development may have on the receiving environment.

No waste will be generated from the investigatory works, therefore no storage and/or disposal will be required. Material disturbed during the works will not be removed from this location by the site investigation plant utilised. Rather, samples taken will be recovered from the seabed and stored in sealed containers for testing and, thus they are not considered waste. Plant and machinery used for the site investigation works will not emit waste during the works and will have measures on board to control any spillages / materials loose on deck.

19 MATERIAL ASSETS

19.1 Introduction

Material Assets are defined as "*resources that are valued and that are intrinsic to specific places*" (EPA, 2015). The 2022 EPA '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*' further clarifies that material assets can be taken to mean built services and infrastructure, including traffic. While this report is not an EIAR, this section of the AIMU report describes and assesses the potential impacts of the proposed works on material assets.

A material asset may either of human or natural origin. Economic assets of natural origin include non-renewable resources such as minerals and soils and renewable resources such as water.

This chapter assesses the following human and natural material assets:

- Utilities; and
- Coastal Processes.

19.2 Receiving Environment

19.2.1 Utilities

There is an electricity cable crossing the navigation channel to the west of the port as illustrated in Figure 19.1. This provides power to Foynes Island from the mainland. There are no other known utilities in close proximity to the proposed Marine SI area.

Figure 19.1: Electricity Cable across navigation channel at Foynes

19.2.2 Coastal Processes

The coastal process analysis was undertaken using RPS' in-house suite of MIKE coastal process models. The hydraulic model was based on RPS existing Shannon Estuary model which has previously been developed for projects relating to Shannon Foynes Port. The model has been extensively calibrated and validated.

19.2.2.1 Tidal Flows

The model with the existing bathymetry was run for run for a spring neap cycle to provide water levels and current velocities around Foynes Island. Figure 19.2 and Figure 19.3 show the typical spring flood and ebb flow patterns around the area.

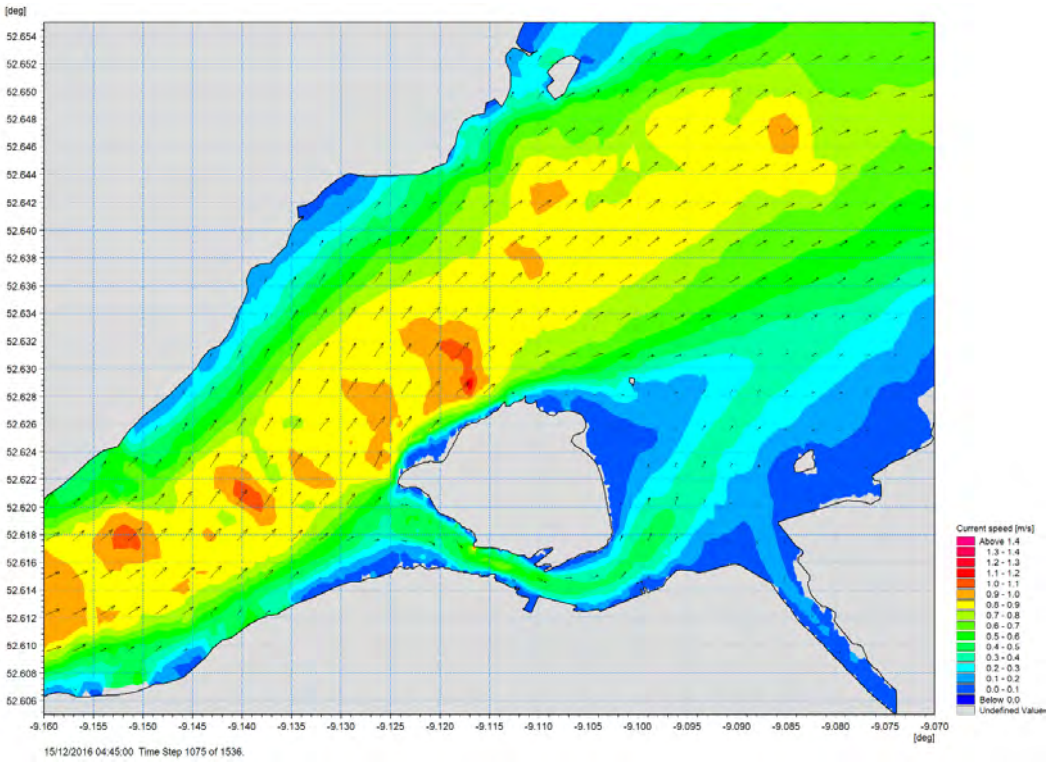

Figure 19.2: Existing bathymetry – Spring flood flow current velocities and vectors around Foynes Island

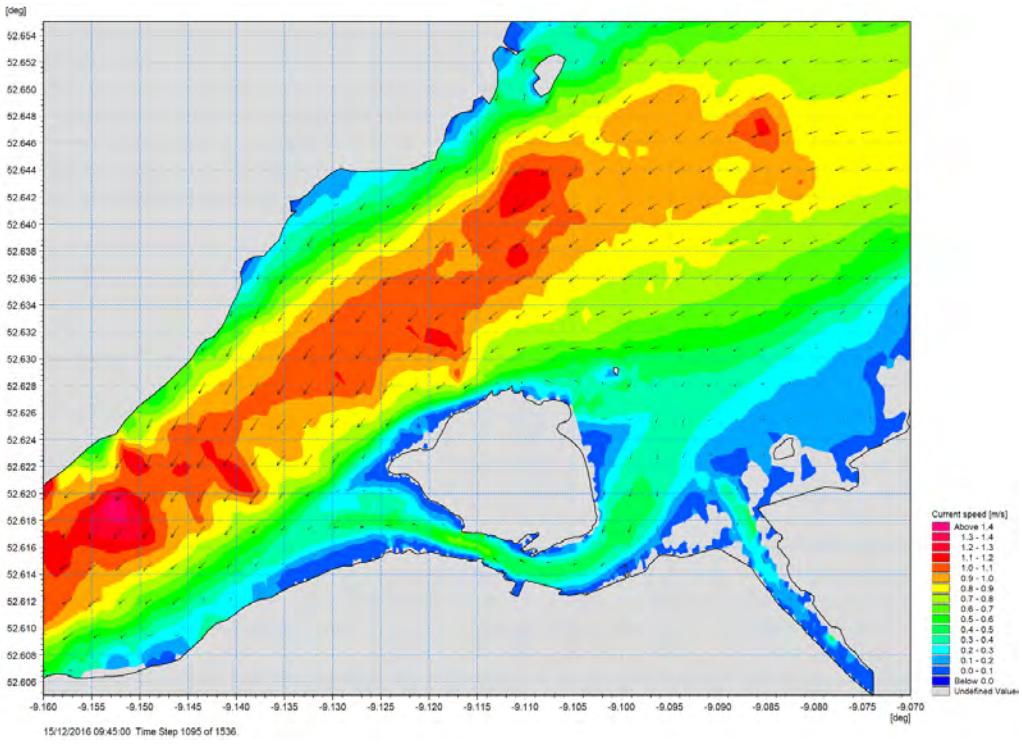

Figure 19.3: Existing bathymetry – Spring ebb flow current velocities and vectors around Foynes Island

19.2.2.2 Wave Climate

The most significant waves at the site are produced by winds blowing along the axis of the Shannon estuary. The wave climate around the area has been simulated for 1 in 1 year return period storms from 240oN and 045oN. The significant wave heights and mean wave directions of these storm waves around the area at a

time of high tide are shown in Figure 19.4 and Figure 19.5. The mean wave periods of the waves on the north-western side of Foynes Island are typically about 3.3s during these 1 in 1 year return period storm conditions.

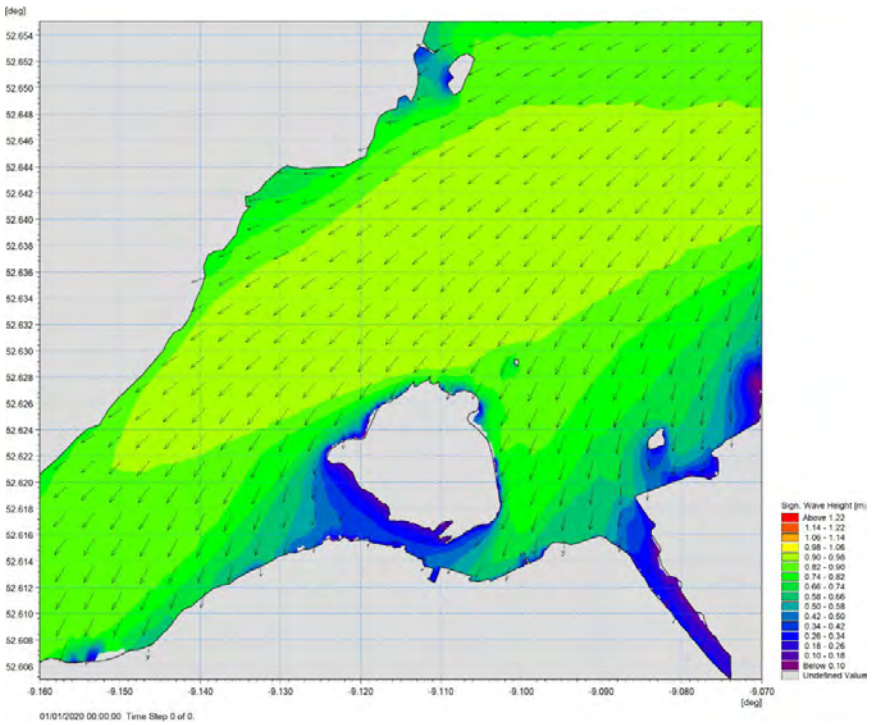

Figure 19.4: Significant wave height and mean wave direction – 1 in 1 year return period from 045ON

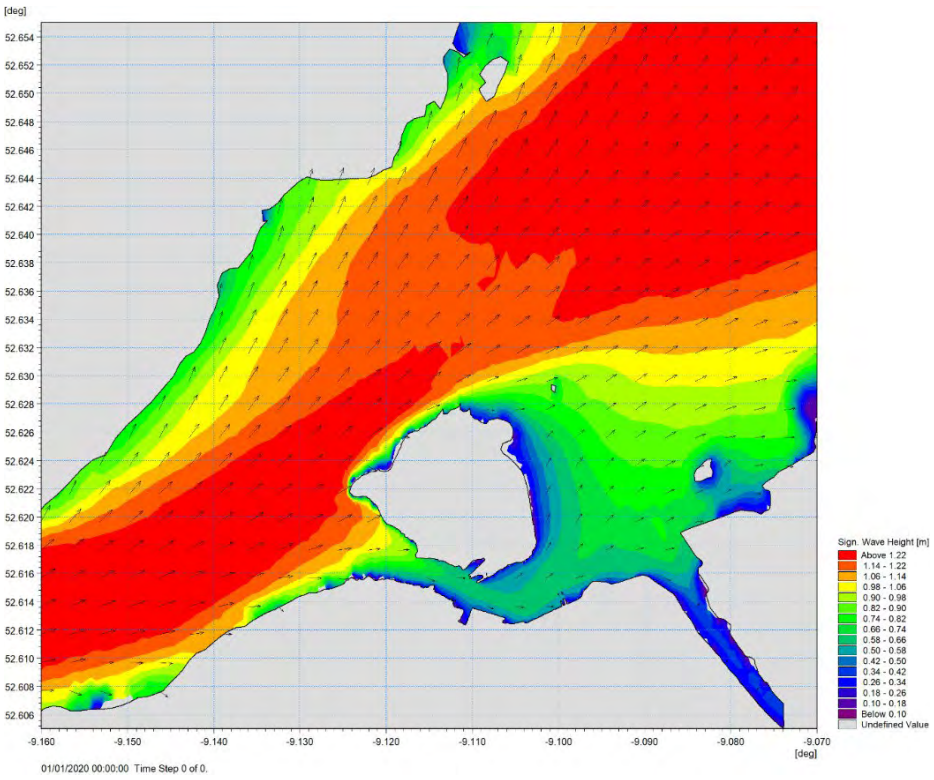

Figure 19.5: Significant wave height and mean wave direction – 1 in 50-year return period event from 240ON

19.2.2.3 Sediment Transport

The previous dredging studies undertaken for Shannon Foynes Port, have shown that while there is some deposition of silt in the harbour area to the south of Foynes Island the main estuary flow on the north-western side of the Island are such that the main channel is dispersive for fine sediment and the bed material in this area has sufficient coarse fractions that the bed in the main channel remains stable under the current flow regime.

19.3 Potential Impacts

19.3.1 Utilities

The Marine SI will not impact on any known utilities in the area of the proposed works. In advance of any intrusive works in the foreshore area a review of any anomalies / features consistent with possible utility services arising from the Marine Geophysical Survey will be undertaken to ensure that there is no potential for impact.

Overall, it has been determined that the sensitivity of the receptor is **Negligible** (given the lack of services in the area), and the magnitude of the impact is considered to be **Negligible**, therefore the significance of effect is **Negligible**.

19.3.2 Coastal Processes

The nature of the marine SI works (i.e., drilling of boreholes) is such that no major impacts on tidal flows and wave climate are expected. However, in terms of sediment transport within the Shannon Estuary the marine SI works may have a slight negative impact as some sediment may be introduced into the water column. This effect could extend over a large geographical area due to tidal flows and waves. However, given the dispersive nature of the coastal processes in the main channel of the Estuary and the small-scale nature of the works, it is likely that this effect would only be temporary and short-term in nature and conditions may return to baseline after the works are complete.

Overall, it has been determined that the sensitivity of the receptor is **Medium**, and the magnitude of the impact is considered to be **Low**. Therefore, there is expected to be **Minor** impacts. However, it is expected that, with implementation of mitigation measures (as described in Section 7.4.1), the overall impact will be **Negligible**.

19.4 Mitigation Measures

19.4.1 Utilities

As it stands, no mitigation measures recommended for utilities as the proposed works were deemed to only have **Negligible** impacts on receptors in the area. However, a review of any anomalies / features consistent with possible utility services arising from the Marine Geophysical Survey will be undertaken to ensure that there is no potential for impact.

19.4.2 Coastal Processes

No mitigation measures recommended for coastal processes as the proposed works were deemed to only have **Minor** impacts on receptors in the area.

20 ENVIRONMENTAL INTERACTIONS

The potential interaction between environmental aspects, arising from within the Foynes Island Marine SI were considered to ensure that the combination of impacts was correctly examined, and any required mitigation measures included.

Each technical chapter of the AIMU report details individual environmental baseline information and identifies the significant potential of the effects/impacts of the marine site investigation. In addition, the potential for other environmental interactions is identified and the relevant impact either on, or from, these other aspects is analysed.

This chapter summarises the significance of these interactive and inter-related impacts within the Foynes Island Marine SI. Table 20.1 shows a matrix of potential interactions between each technical chapter of this AIMU report with a detailed description of each interaction presented in Table 20.2.

While many potential inter-relationships and inter-actions have been identified, it is anticipated that the discrete environmental mitigation measures included in the Foynes Island Marine SI (and outlined in the relevant sections of the AIMU report) will also minimise or off-set potential for significant effects due to interactions.

Table 20.1: Matrix to show interactions between Technical Chapters 6-18 (KEY Potential ✓ interaction between technical chapters)

	Land, Soils, Geology & Hydrogeology	Water Quality	Biodiversity	Fisheries & Aquaculture	Air Quality	Noise	Landscape & Seascape	Traffic & Transport (including Navigation)	Archaeology & Cultural Heritage	Population & Human Health	Major Accidents & Disasters	Climate	Waste	Material Assets
Chapter 6- Land, Soils, Geology & Hydrogeology														
Chapter 7- Water	✓													
Chapter 8- Biodiversity	✓	✓												
Chapter 9- Fisheries & Aquaculture		✓	✓											
Chapter 10- Air Quality			✓											
Chapter 11- Noise			✓	✓										
Chapter 12- Landscape & Seascape														
Chapter 13- Traffic & Transport (including Navigation)					✓	✓								
Chapter 14- Archaeology & Cultural Heritage	✓						✓							
Chapter 15- Population & Human Health		✓		✓	✓	✓	✓	✓						
Chapter 16- Major Accidents & Disasters														
Chapter 17- Climate														
Chapter 18- Waste														
Chapter 19- Material Assets	✓	✓	✓	✓										

Table 20.2: Significance of these interactive and inter-related impacts within the Foynes Island Marine SI

Chapter	Interaction
Chapter 6 – Land, Soils, Geology & Hydrogeology	The most significant interactions in relation to Land, Soils, Geology and Hydrogeology are Water, Biodiversity and Archaeology and Cultural Heritage, and Material Assets. Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included. ***Water:*** There is an inter-relationship between Land, Soils, Geology and Hydrogeology and Water (marine sediments and water quality). The interaction of borehole drilling, and the removal of sediment samples may result in sediment entering the water column. It is likely that currents and tides may transport disturbed sediment beyond the Marine Usage license area which may affect the wider marine environment of the Shannon Estuary. As described in Section 6.2.1.1. (Sediment), infralittoral and circalittoral fine and muddy sand (EUNIS Habitat Type code A5.23 – A5.26) may be disturbed from the SI work. However, it is expected that any interaction will be short-term, and sediment conditions will likely return to baseline after works are completed. Furthermore, SI works do not interact with the terrestrial environment as works are taking place within the foreshore license area. ***Biodiversity:*** An inter-relationship exists between Soils, Geology & Hydrogeology and Biodiversity. Avian & aquatic ecology is dependent on surface water quality which can be affected during Marine SI works. Borehole drilling can cause temporary suspension and release of seabed sediments within the foreshore area. Similarly, These operations can cause a localised negative impact on water quality, water dependant habitats and aquatic ecology. Therefore, the risk to water quality and marine ecology is considered very low and where it does arise appropriate water quality mitigation measures have been proposed. Marine SI works have the potential to negatively impact on the benthic ecology in the area. This is due to the fact that boreholes are required to be drilled on the seabed of the Shannon Estuary where there are a number of benthic habitats. The benthic ecology and habitats will be affected through minor disturbance around the borehole location and sample stations and a very small volume of substratum loss, direct displacement or smothering during drilling. The small volumes of sediment displaced during the sampling may result in a thin layer of smothering however this deposited sediment will be quickly dispersed given the strong currents in the area. Sedimentary benthic habitats identified within the survey area are widespread and common for the region. Therefore, any disturbance is not expected to have an effect on the wider population of benthic fauna and the significance of any effect will be minor for sedimentary habitats. ***Archaeology and Cultural Heritage:*** A potential interaction exists between Land, Soils, Geology & Hydrogeology and Archaeology & Cultural Heritage in that the disturbance of the sediments could have the potential to impact on unknown archaeology. Prior to SI works, an archaeological survey and assessment of the terrestrial, intertidal, and underwater areas will identify areas of archaeological significance with the foreshore area. For the duration of the works, archaeological monitoring of the area will take place and appropriate facilities will be provided to examine identified material. Archaeological assessment has located prehistoric and more recent archaeological sites within the wider area of Foynes. In addition, a number of fish weir/traps are present on the OS historic maps for the areas under assessment which are of cultural

Chapter	Interaction
	importance. Overall, the existing archaeological record demonstrates a high potential for Foynes Island, with a list of known sites located upon the island. As a result, the surrounding foreshore/intertidal areas should be regarded as retaining high cultural potential. The appropriate mitigation measures have been presented to protect sites and material of archaeological and cultural significance. ***Material Assets*** *Coastal Processes:* Displacement of material from borehole drilling will result in increased suspended sediments in the water column that could result in Sediment transport of may result in tides and currents to transport potential contaminants associated with sediment from the marine SI works. However, the likelihood of contaminants being transported by coastal processes are low. *Utilities:* An electrical cable that powers Foynes Island from the mainland is located within the navigation channel. Extensive assessment of the foreshore area has taken place and the impact of the SI works will not impede on this utility for the duration of the works. However, a review of any anomalies / features consistent with possible utility services arising from the Marine Geophysical Survey will be undertaken to ensure that there is no potential for impact.
Chapter 7 – Water Quality	The most significant interactions in relation to Water are Biodiversity, Fisheries and Aquaculture, Population and Human Health, Climate and Material Assets. Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included. ***Biodiversity:*** The proposed marine SI works will take place within designated sites, such as the Lower River Shannon SAC and the River Shannon and Fergus Estuaries SPA. Impacts on water quality for these water dependent protected areas cannot be discounted. As stated in the Supporting Information for Screening for Appropriate Assessment Report (Appendix D) some Annex I habitats within the Lower River Shannon SAC such as Estuaries [1130], Mudflats and Sandflats [1140], and Reefs [1170] may be affected by marine SI works. Within the Shannon Estuary where there are a number of protected fish species including Atlantic salmon, sea lamprey and river lamprey. There are also other key species that may be impacted including, eel and smelt, which, while not designated species under the Lower River Shannon SAC, are important in the overall biodiversity of the estuary. It is unlikely that significant impacts on these species as a result of water quality impacts will be experienced during the SI works which are mainly confined to the foreshore licence area, albeit minor interactions may occur. The mitigation measures recommended for water quality should ensure that any interaction with water quality does not result in negative effects. ***Fisheries and Aquaculture:*** It is not expected that the marine SI works will impact on fisheries and aquaculture. Shellfish waters are located far from the Marine Area Usage licence area and the proposed works are temporary, relatively small and minor in scale. However, it is worth accounting for the interactions that may arise between water quality and Fisheries & Aquaculture in the vicinity Foynes Island. A diverse population of resident and migratory fish species such as Atlantic salmon, river lamprey and sea lamprey are found within the Lower River Shannon SAC and migrate to the River Shannon and its tributaries. The SI works will be limited to the foreshore area and the interaction is deemed to be small with mitigation measures in place to address any possible

Chapter	Interaction
	interaction due to water quality impacts from spills and contamination and fisheries and aquaculture. ***Population & Human Health*:** It is anticipated there will have little interaction in relation to water and population and human health. Works will be carried out in the foreshore area away from Foynes town. There may indirect disruption to the Foynes Yacht Club whose members regularly use the Shannon Estuary for sailing and leisure pursuits however water quality impacts could affect the use of the area for leisure activities, however the mitigation in place for water quality should ensure that this does not significantly affect population and human health. ***Material Assets:*** The marine SI works may have a slight negative impact as some sediment from the sampling process will be disturbed and may enter the water column. Tidal flows and waves may transport sediment beyond the works area and out into Shannon Estuary. However, given the dispersive nature of the currents in the area these minor volumes of displaced sediment will be quickly dispersed and will not impact on water quality.
Chapter 8 – Biodiversity	The most significant interactions in relation to Biodiversity are Land, Soils, Geology & Hydrogeology, Water Quality, Fisheries and Aquaculture, Air Quality, Noise, Traffic and Transport (including Navigation), Climate and Material Assets. Consideration of each are provided in relevant chapters within the AIMU report with appropriate mitigation measures included. **Land, Soils, Geology & Hydrogeology:** An inter-relationship exists between Marine Ecology, Water Quality and Land, Soil, Geology, Hydrogeology. The Marine SI works have the potential to cause the re-suspension of seabed sediments leading to a potential impact on water quality and benthic ecology. In addition to the impacts assessed in Chapter 6 which concluded there was no potential for significant effects, the impact of the Marine SI works has been assessed in Chapter 8 Biodiversity, Chapter 7 Water Quality and Chapter 19, Material Assets; Coastal Process. The findings of each assessment has indicated that provided the implementation of mitigation measures as listed in Chapter 7 and Chapter 8, no impacts to water quality and marine ecology are expected. **Water Quality**: There are water dependent habitats and species within the Marine SI works area, particularly those habitats and species which are qualifying interests of the European Sites. Suspended sediment generated during the borehole drilling can have a negative impact on water quality, water dependant habitats and aquatic ecology particularly in areas immediately adjacent to the works area. Chapter 7 Water Quality has assessed the impact of construction operations on water quality, with the implementation of the mitigation measures (listed in each chapter) during demolition, clearing and berth construction activities, the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of environmental effect to Imperceptible and therefore reducing the risk to aquatic ecology. ***Fisheries and Aquaculture:*** As mentioned in Section 9.2.2, sea lamprey spawn in the Lower Shannon mainly from May to July and are expected to migrate up the Shannon estuary in spring and early summer. River lamprey spawn in spring in March and April but their spawning migration tends to me much more extended than for sea lamprey stretching from autumn to spring. There is

Chapter	Interaction
	an indication that sea lamprey is more likely to occur in sheltered areas, such as ports, river mouths and small inlets. It should be noted that there are no shellfish waters within the Foreshore boundary but in the wider context of the Shannon Estuary, there are four designated shellfish waters. There is also no licenced aquaculture within the Marine SI works area, with the closest licensed area approximately 800 metres from the SI works. The costal processes in the area of the Marine Works are largely dispersive and given the small-scale nature of the works the impact on fisheries and aquaculture will not be significant with any suspended sediment dispersed before it reaches these areas. ***Air Quality:*** The nature of the Marine SI works is limited to small plant machinery and such works are temporary so it is expected there will be little interaction between biodiversity and air quality. It should be noted that air quality monitoring for human health and the wider environment takes place in close proximity to Foynes. The EPA carries out continuous monitoring for NO_2, SO_2, Fine Particulate Matter ($PM_{2.5}$), Coarse Particulate Matter (PM_{10}) and Total Particulate Matter (General Dust) at a site on a farm near Askeaton in Co. Limerick located circa 5km east of Foynes. There are six dust monitors in place at the Foynes facility which measures the generation of fugitive dust emissions levels. Air particulates should not pose any negative impact to the wider environment especially for the duration of marine SI works. Works are small in scale and are limited small plant machinery. Therefore, works will not impact on air quality in the area surrounding Foynes port and therefore there is no potential for significant effects on biodiversity from air quality impacts. ***Noise:*** The possibility of likely significant aerial noise and underwater noise from the marine SI works on biodiversity cannot be discounted until further evaluation and analysis. Underwater noise due moving of plant equipment, geophysical surveys and drilling of boreholes as well as disruption of the seabed are expected to create impacts to marine mammals and protected species. The effects of the noise disturbances may be felt beyond the works area. However, mitigation measures are outlined in the Annex IV Species Risk Assessment, Appendix C and Section 11.3.1 to offset any impact of underwater noise on biodiversity. Fish species, such as Atlantic salmon and sea and river lamprey have varying sensitivities to sound. The hearing of these species only involves particle motion and not sound pressure, and they are therefore less susceptible to impacts from geophysical survey. These species are susceptible to internal injury (barotrauma) from a rapid pressure change, i.e., unexploded ordnance detonation, which does not form part of the proposed site investigations (Popper et al., 2014). Geophysical survey results have found that sound levels generated from marine SI works are unlikely to be audible to fish species. Proposed marine surveys will be temporary in any one location and the disturbance effects to fish resulting from the geotechnical surveys will not be significant. ***Traffic and Transport (including Navigation):*** Due to the marine SI works being carried out within the Shannon Estuary, it is unlikely that any major impacts on traffic and transportation will be experienced. This is because there are no passenger ferry services operating out of Foynes Port and the traffic associated with works will be limited to the mobilisation of the typical plant to the site. In some cases, plant will be mobilised by sea. Transporting marine plant to Foynes Port

Chapter	Interaction
	and the marine SI works will not increase the traffic in the Port area substantially when compared to the existing HGV movement and operations within a busy Port Therefore there will be limited increases in noise levels that would significantly impact on the bird population in the SPA, but this will deal with in more detail in the NIS for the Marine SI works. Given the marine SI works are temporary and are small in scale, and with the appropriate mitigation measures in place, baseline conditions will return once works have been completed. ***Material Assets*** *Coastal Processes:* There is expected to be some interaction between Biodiversity and Coastal Processes. During marine SI works, small amounts of sediment is likely to be displaced however not to the extent where normal sediment transport regimes and benthic ecology habitats will be significantly affected in the Shannon Estuary. Benthic ecology and habitats will be affected through minor disturbance around the borehole location and sample stations and a very small volume of substratum loss, direct displacement or smothering during drilling. The small volumes of sediment displaced during the Marine SI may result in a thin layer of smothering however this deposited sediment will be quickly dispersed given the strong currents in the area. Sedimentary benthic habitats identified within the survey area are widespread and common for the region. Therefore, any disturbance is not expected to have an effect on the wider population of benthic fauna and the significance of any effect will be minor for sedimentary habitats. Mitigation measures have been provided and it is expected that impacts will be minor.
Chapter 9 – Fisheries and Aquaculture	The most significant interactions in relation to Fisheries and Aquaculture are considered to be Water Quality, Population & Human Health, Climate and Material Assets. Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included. **Land, Soils, Geology & Hydrogeology:** An inter-relationship exists between Fisheries and Aquaculture, Water Quality and Land, Soil, Geology, Hydrogeology. The Marine SI works have the potential to cause the re-suspension of seabed sediments leading to a potential impact on water quality and therefore fisheries and aquaculture. In addition to the impacts assessed in Chapter 6 Land, Soils, Geology & Hydrogeology which concluded there was no potential for significant effects, the impact of the Marine SI works has been assessed in Chapter 8 Biodiversity, Chapter 7 Water Quality and Chapter 19, Material Assets; Coastal Process. The findings of each assessment has indicated that provided the implementation of mitigation measures as listed in Chapter 7 and Chapter 8, no impacts to water quality and fisheries and aquaculture are expected. **Water Quality**: Fisheries and aquaculture are dependent on good water quality. Suspended sediment generated during the borehole drilling can have a negative impact on water quality, water dependant species particularly in areas immediately adjacent to the works area. Chapter 7 Water Quality has assessed the impact of the Marine SI works on water quality, with the implementation of the mitigation measures the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of environmental effect to negligible and therefore reducing the risk to fisheries and aquaculture.

Chapter	Interaction
	Noise: The marine SI works are likely to add to the existing underwater noise levels in the area. Any sources of additional noise will be confined to an area close to the source where works are taking place and attenuate rapidly into the seabed. The area is noise sensitive due to the proximity of marine species including fish (e.g., Atlantic Salmon, River Lamprey, Sea Lamprey, Eel, Smelt). Given that sound levels are unlikely to be audible to fish species and the activity will be temporary in any one location the magnitude of disturbance effects to fish resulting from the geotechnical surveys has been assessed as temporary and Negligible. ***Population & Human Health:*** There is the potential for fisheries and aquaculture to impact on human health should the quality of the shellfish be impacted by the proposed SI works. The assessment of water quality impacts and the mitigation measures recommended will ensure that there will be no impact from the Marine SI works on water quality and therefore shellfish or human health. ***Material Assets - Coastal Processes:*** There will be minor disturbance around the borehole location and sample stations and a very small volume of substratum loss, direct displacement or smothering during drilling. However, given the dispersive nature of the currents in the area these minor volumes of displaced sediment will be quickly dispersed before reaching the Shellfish Waters or licenced aquaculture.
Chapter 10 – Air Quality	The most significant interactions in relation to Air Quality are considered to be Traffic & Transport, Population & Human Health and Landscape and Visual. Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included. ***Traffic & Transport (including Navigation):*** The air quality for the Foynes area will not be reduced from the SI works as a result of traffic and transport. Increased traffic to and from Foynes Port for undertaking the Marine SI works will only entail mobilisation and demobilisation of marine plant and will not significantly increase emissions or dust. ***Population & Human Health:*** There will be no potential for significant effects on the population of human health from air quality given that the impacts on air quality will be negligible due to the limited additional traffic and emissions associated with the marine plant.
Chapter 11 – Noise	The most significant interactions in relation to Noise are considered to be, Biodiversity, Fisheries and Aquaculture Traffic and Transport (including Navigation), Population & Human Health. Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included. ***Biodiversity:*** Underwater noise due moving of plant equipment, geophysical surveys and drilling of boreholes as well as disruption of the seabed are expected to create impacts to marine mammals and protected species. The effects of the noise disturbances may be felt beyond the works area. However, mitigation measures are outlined in the Annex IV Species Risk Assessment, Appendix C and Section 11.3.1 to offset any impact of underwater noise on biodiversity. ***Fisheries and Aquaculture:*** Any sources of additional noise will be confined to an area close to the source where works are taking place and attenuate rapidly into the seabed. The area is noise sensitive due to the proximity of marine species including fish (e.g., Atlantic Salmon, River Lamprey, Sea Lamprey, Eel, Smelt). Given that sound levels are unlikely to be audible to fish

Chapter	Interaction
	species and the activity will be temporary in any one location the magnitude of disturbance effects to fish resulting from the geotechnical surveys has been assessed as temporary and Negligible. ***Traffic & Transport (including Navigation):*** The traffic and transport of the Marine SI Plant to Foynes Port from where it will be deployed the SI areas will include the mobilisation and demobilisation of some plant, with others plant be mobilised to site by sea. This will not increase noise levels significantly in this busy operationally Port and will not result in a significant environmental effect. ***Population & Human Health:*** There is expected to be some increase in noise levels which will be confined to the foreshore area. However, it is not expected that noise levels will adversely affect the health and wellbeing of the local population of Foynes nor the surrounding areas. The SI works will only take place within the Shannon Estuary, away from areas of habitation.
Chapter 12 - Landscape and Seascape	The most significant interaction in relation to Landscape and Seascape are considered to be Archaeology & Cultural Heritage and Population & Human Health. Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included. ***Archaeology & Cultural Heritage:*** There will be a short-term impact of the presence of marine plant while the SI works are being carried out. This impact will be temporary in duration. The marine SI works are not expected to have any permanent impact on the landscape and seascape aspects of the surrounding area that would have a significant effect on the archaeology and cultural heritage. ***Population & Human Health:*** There will be a short-term impact of the presence of marine plant while the SI works are being carried out close to Foynes Port which will be visual to the local population. This impact will be temporary in duration. The marine SI works are not expected to have any permanent impact on the population and human health of the population of Foynes Town given that the area is already associated with a busy Port where vessels are moving continuously and the visual impacts of a survey vessel and jack up barge will not be significant when compared to the large cargo vessels that dock at the quayside.
Chapter 13 – Traffic and Transport (including Navigation)	The most significant interaction in relation to Traffic & Transport (including Navigation) are considered to be Population & Human Health. Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included. ***Air Quality:*** The air quality for the Foynes area will not be reduced from the SI works as a result of traffic and transport. Increased traffic to and from Foynes Port for undertaking the Marine SI works will only entail mobilisation and demobilisation of marine plant and will not significantly increase emissions or dust. ***Noise:*** The traffic generated from the transportation of the Marine SI Plant to Foynes Port from where it will be deployed to the SI areas will include very limited traffic movements with the survey vessel and possible support vehicle whilst the jack up barge will be transported by sea. Given the number of traffic movements required will be very low there will not be a significant increase noise levels in this busy operational Port and will not result in a significant environmental effect.

Chapter	Interaction
	Population & Human Health: Foynes Port is a busy commercial and industrial port and any disruption to daily activities will impact on port users either directly or indirectly, positively or negatively. A Marine Notice will be issued in advance of any marine SI works taking place so as all mariners operating in the area are aware of the operations. This is to ensure the safety of all operators within Foynes Port. In addition, the Marine SI Contractor will have all the necessary health and safety procedures in place which will include cognisance of maritime safety. The expected impacts to the population of Foynes and the surrounding area are considered to be negligible.
Chapter 14 Archaeology and Cultural Heritage	The most significant interaction in relation to Archaeology and Cultural Heritage are considered to be Land, Soils, Geology and Hydrogeology and Landscape and Seascape. Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included. ***Land, Soils, Geology and Hydrogeology***: A potential interaction exists between Land, Soils, Geology & Hydrogeology and Archaeology & Cultural Heritage in that the disturbance of the sediments could have the potential to impact on unknown archaeology. Prior to SI works, an archaeological survey and assessment of the terrestrial, intertidal, and underwater areas will identify areas of archaeological significance with the foreshore area. For the duration of the works, archaeological monitoring of the area will take place and appropriate facilities will be provided to examine identified material. Archaeological assessment has located prehistoric and more recent archaeological sites within the wider area of Foynes. In addition, a number of fish weir/traps are present on the OS historic maps for the areas under assessment which are of cultural importance. Overall, the existing archaeological record demonstrates a high potential for Foynes Island, with a list of known sites located upon the island. As a result, the surrounding foreshore/intertidal areas should be regarded as retaining high cultural potential. The appropriate mitigation measures have been presented to protect sites and material of archaeological and cultural significance. ***Landscape and Seascape:*** There will be a short-term impact of the presence of marine plant while the SI works are being carried out. This impact will be temporary in duration. The marine SI works are not expected to have any permanent impact on the landscape and seascape aspects of the surrounding area that would have a significant effect on the archaeology and cultural heritage.
Chapter 15- Population & Human Health	The most significant interactions in relation to Population & Human Health are considered to be Water Quality, Fisheries and Aquaculture, Air Quality, Noise, Landscape and Seascape, Traffic and transportation (including Navigation). Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included where required. ***Water Quality:*** It is anticipated there will have little interaction in relation to water and population and human health. Works will be carried out in the foreshore area away from Foynes town. There may indirect disruption to the Foynes Yacht Club whose members regularly use the Shannon Estuary for sailing and leisure pursuits however water quality impacts could affect the use of the area for leisure activities, however the mitigation in place for water quality should ensure that this does not significantly affect population and human health

Chapter	Interaction
	Fisheries and Aquaculture: There is the potential for fisheries and aquaculture to impact on human health should the quality of the shellfish be impacted by the proposed SI works. The assessment of water quality impacts and the mitigation measures recommended will ensure that there will be no impact from the Marine SI works on water quality and therefore shellfish or human health. ***Air Quality:*** There will be no potential for significant effects on the population of human health from air quality given that the impacts on air quality will be negligible due to the limited additional traffic and emissions associated with the marine plant. ***Noise***: There is expected to be some increase in noise levels which will be confined to the foreshore area. However, it is not expected that noise levels will adversely affect the health and wellbeing of the local population of Foynes nor the surrounding areas. The SI works will only take place within the Shannon Estuary, away from areas of habitation. ***Landscape and Seascape:*** There will be a short-term impact of the presence of marine plant while the SI works are being carried out close to Foynes Port which will be visual to the local population. This impact will be temporary in duration. The marine SI works are not expected to have any permanent impact on the population and human health of the population of Foynes Town given that the area is already associated with a busy Port where vessels are moving continuously and the visual impacts of a survey vessel and jack up barge will not be significant when compared to the large cargo vessels that dock at the quayside. ***Traffic and transportation (including Navigation):*** Foynes Port is a busy commercial and industrial port and any disruption to daily activities will impact on port users either directly or indirectly, positively or negatively. A Marine Notice will be issued in advance of any marine SI works taking place so as all mariners operating in the area are aware of the operations. This is to ensure the safety of all operators within Foynes Port. In addition, the Marine SI Contractor will have all the necessary health and safety procedures in place which will include cognisance of maritime safety. The expected impacts to the population of Foynes and the surrounding area are considered to be negligible.
Chapter 19 – Material Assets: Coastal Processes	The most significant interactions in relation to Material Assets: Coastal Processes are considered to be Land, Soils, Geology and Hydrogeology, Water Quality, Biodiversity and Fisheries and Aquaculture, Consideration of each is provided in relevant chapters within the AIMU report with appropriate mitigation measures included where required. ***Land, Soils, Geology and Hydrogeology***: Displacement of material from borehole drilling will result in increased suspended sediments in the water column that could result in Sediment transport of may result in tides and currents to transport potential contaminants associated with sediment from the marine SI works such as oils. However, the likelihood of contaminants being transported by coastal processes are low. ***Water Quality:*** The marine SI works may have a slight negative impact on water quality as some sediment from the sampling process will be disturbed and may enter the water column. Tidal flows and waves may transport sediment beyond the works area and out into Shannon Estuary.

Chapter	Interaction
	However, it is likely that disruption to sediment transport regimes would only be temporary, and conditions may return to baseline after the works have been completed. **Biodiversity:** There is expected to be some interaction between Biodiversity and Coastal Processes. During marine SI works, small amounts of sediment is likely to be displaced however not to the extent where normal sediment transport regimes and benthic ecology habitats will be significantly affected in the Shannon Estuary. Benthic ecology and habitats will be affected through minor disturbance around the borehole location and sample stations and a very small volume of substratum loss, direct displacement or smothering during drilling. The small volumes of sediment displaced during the Marine SI may result in a thin layer of smothering however this deposited sediment will be quickly dispersed given the strong currents in the area. Sedimentary benthic habitats identified within the survey area are widespread and common for the region. Therefore, any disturbance is not expected to have an effect on the wider population of benthic fauna and the significance of any effect will be minor for sedimentary habitats. Mitigation measures have been provided and it is expected that impacts will be minor. ***Fisheries and Aquaculture:*** There will be minor disturbance around the borehole location and sample stations and a very small volume of substratum loss, direct displacement or smothering during drilling. However, given the dispersive nature of the currents in the area these minor volumes of displaced sediment will be quickly dispersed before reaching the Shellfish Waters or licenced aquaculture.

21 CUMULATIVE ASSESSMENT

21.1.1 Projects Considered in Cumulative Assessment

Table 21.1 lists the various Projects have been considered in the cumulative assessment.

Table 21.1: Other projects in the vicinity of Foynes Island Marine SI works

Development	Location	Activities	Period	Distance from Foynes Island
Eirgrid Cross Shannon 400kV Electricity Cable	Moneypoint, Co Clare to Kilpaddoge, Co Kerry	Laying of 400 kV submarine cables across the Lower Shannon Estuary	2023/2024	19 km
Shannon Technology and Energy Park	Ardmore point. Co Kerry	Site investigations	None	22km
Moneypoint Atlantic Energy Hub	Moneypoint, Co Clare	Site investigations	None	22km
Clarus Offshore Wind Farm	Extends from Tarbert in the Lower Shannon Estuary to the Mouth of the Shannon and along the Co Clare Coastline to Doonbeg	Site investigations (subject to foreshore consent)	Programme 5 years post consent	17km
Illen Offshore Array	Extends from Kilpaddoge, Co Kerry in the Lower Shannon Estuary to the Mouth of the Shannon and seaward to the 12nm limit	Site investigations (subject to foreshore consent)	Programme 5 years post consent	19 km
Mainstream Renewable Power Ltd.	Extends from Tarbert in the Lower Shannon Estuary to the Mouth of the Shannon and northwards along the Co Clare Coastline to Doonbeg and southwards along the County Kerry Coastline to the south of Ballyheige Bay	Site investigations (subject to foreshore consent)	2023/2024 assuming foreshore consent	17km
Moneypoint Offshore Wind	Moneypoint Co Clare in the Lower Shannon Estuary through the Mouth of the Shannon and seaward to the 12nm limit	Site investigations (subject to foreshore consent)	None	22km
Rian Offshore Array Ltd.	Tarbert Co Kerry in the Lower Shannon Estuary through the Mouth of the Shannon and seaward to the 12nm limit	Site investigations (subject to foreshore consent)	None	17km

21.1.2 Designated / European Sites

The assessment in Section **Error! Reference source not found.** concluded that the significance of the effect of the proposed site investigations on designated / European sites, with the implementation of mitigation measures will be **Minor**. However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

Cumulative effects could arise from silt from the drilling of boreholes nearby to designated / European sites could enter the water column and be transported by currents and tides. If multiple projects are ongoing at the

same time, this has the potential to exacerbate negative impacts on the conservation objectives of these sites. leading to significant degradation in potential qualifying interests of these sites and could potentially affect a number of additional sites in a wider geographical area.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section **Error! Reference source not found.**. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to marine mammals will be **Temporary** and **Slight**.

21.1.3 Marine Mammals

The assessment in Section 8.3 concluded that the significance of the effect of the proposed site investigations on marine mammals, with the implementation of mitigation measures will be **Negligible** to **Minor**. However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

Cumulative effects are likely to result where localised disturbance from more than one activity either occurs simultaneously resulting in a wider zone of disturbance restricting foraging, migratory or breeding behaviour; or consecutively within a restricted area resulting in an extended period of disturbance or the production of a barrier restricting movements.

Given that Lower River Shannon SAC lies within the Maritime Usage Area Licence Application, the largest potential for a significant cumulative effect would be on common bottlenose dolphin within this SAC. The confined nature of the SAC within the estuary and the fact that animals form a discrete genetic population means that barrier effects or extended periods of disturbance could have a greater effect than would be normally experienced in open coastal waters.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 8.4. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to marine mammals will be **Temporary** and **Slight**.

21.1.4 Benthic Ecology / Marine Habitats

The assessment in Section 8.3 concluded that the significance of the effect of the proposed site investigations on benthic ecology and marine habitats, with the implementation of mitigation measures will be **Negligible**. However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

Given that there are a number of marine community types near the proposed works and within the wider Shannon Estuary, there is potential for significant cumulative effects on these communities and habitats due to the nature of the proposed works. These effects may also affect wider geographical areas when considered cumulatively.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 8.4.3. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to benthic ecology and marine habitats will be **Temporary** and **Not Significant**.

21.1.5 Fish

The assessment in Section 9.2 concluded that the significance of the effect of the proposed site investigations on fish, with the implementation of mitigation measures will be **Negligible**. However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

The Lower River Shannon SAC has a diverse population of resident and migratory fish species and its conservation objectives list sea lamprey, River lamprey and Atlantic salmon as important species. There are also other species present of conservation concern including the European eel. There is potential for significant cumulative effects on these species due to the nature of the proposed works in the area, extending to large parts of the Shannon Estuary.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 7.4. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to fish will be **Temporary** and **Not Significant**.

21.1.6 Water Quality

The assessment in Section 7.3 concluded that the significance of the effect of the proposed site investigations on water quality, with the implementation of mitigation measures will be **Minor**. However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

Given that a number of waterbodies directly impacted by the proposed works are of Good or High overall status, there is potential that cumulative effects could negatively impact the water quality of these bodies, especially in the short term.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 7.4. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to water quality will be **Temporary** and **Slight**.

21.1.7 Underwater Noise

The assessment in Section 11.2 concluded that the significance of the effect of the proposed site investigations on underwater noise, with the implementation of mitigation measures will be **Minor.** However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

Given that the site is noise sensitive (due to the proximity of marine species), there is potential that significant cumulative effects leading to additional underwater noise levels could negatively impact species in the area, especially in the short-term.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 11.3. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to underwater noise will be **Temporary** and **Minor.**

21.1.8 Archaeology & Cultural Heritage

The assessment in Section 14.3 concluded that the significance of the effect of the proposed site investigations on archaeology, with the implementation of mitigation measures will be **Minor**. However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

Given that the existing archaeological record in the area demonstrates a high potential for discoveries and impacts may be seen from equipment used for site investigations, there is potential that significant cumulative effects could negatively impact archaeology in the area.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 14.4. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to archaeology will be **Temporary** and **Slight**.

21.1.9 Coastal Processes

The assessment in Section 19.3 concluded that the significance of the effect of the proposed site investigations on coastal processes, with the implementation of mitigation measures will be **Negligible**. However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

The marine SI works may have a slight negative impact as some sediment may be introduced into the water column. This effect could extend over a large geographical area due to tidal flows and waves. This means that this effect could interact with other projects in the area, exacerbating the overall impacts, while possibly increasing the geographical extent of effects.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 19.4. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to coastal processes will be **Temporary** and **Not Significant**.

21.1.10 Traffic and Transport (including Shipping & Navigation)

The assessment in Section 13 concluded that the significance of the effect of the proposed site investigations on shipping and navigation, with the implementation of mitigation measures will be **Minor.** However, there

remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

The foreshore areas for the marine works are located in busy shipping areas, with high cargo, tanker and passenger vessel densities in areas of the Shannon Estuary. Therefore, there is the potential for significant cumulative effects to occur in the area.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 13.4. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that within the River Shannon Estuary cumulative effects to shipping and navigation will be **Temporary** and **Slight**

21.1.11 Major Accidents & Disasters

The assessment in Section 16.3 concluded that the significance of the effect of the proposed site investigations on major accidents and disasters, with the implementation of mitigation measures will be **Minor.** However, there remains the possibility that if considered alongside other activities occurring within the same region the site investigation works could give rise to significant cumulative effects. This potential is discussed below.

The foreshore areas for the marine works are located in busy shipping areas and relatively nearby to COMAH establishments, therefore there is the potential for significant cumulative effects to occur throughout the Shannon Estuary.

Taking this into consideration, to reduce the significance of potential effects mitigation has been proposed in Section 16.4. Implementation of the project specific mitigation, combined with the temporary nature of the proposed site investigations, will mean that, within the River Shannon Estuary, cumulative effects to major accidents and disasters will be **Temporary** and **Slight.**

22 SUMMARY OF MITIGATIONS

SFPC seek to achieve the highest possible standard of environmental management during the Marine Site Investigation (SI). A summary of all mitigation measures and monitoring requirements proposed within the Assessments of Impacts of the Maritime Usage (AIMU) are contained in this Report.

22.1 Marine Site Investigation (SI) Phase Mitigation Measures

The AIMU report assesses the likely significant effects of the Foynes Project on the environment arising from the Marine Site Investigation (SI). Integration of the engineering design team with the planning and environmental team from an early stage in the project have enabled mitigation by design to be used, causing many likely significant effects to be eliminated or reduced to an acceptable level during the site investigation works. Following an examination, analysis, and evaluation of the direct and indirect significant effects of the project in relation to the receiving environment, additional mitigation measures and monitoring programmes have been recommended which will be fully implemented during the marine SI.

Table 22.1 summarises the mitigation measures and monitoring programmes recommended within the AIMU during the marine SI. All mitigation measures proposed within the NIS been captured by the AIMU.

Table 22.1: Mitigation measures and monitoring recommended within the AIMU

Potential Impact	Summary of Proposed Mitigation
Chapter 6 LAND, SOILS, GEOLOGY AND HYDROGEOLOGY	
Impact on Marine Environment	• No mitigation measures are required for marine soils, geology and hydrogeology as the works are deemed to have negligible to minor impacts.
Impact on Terrestrial Environment	• No mitigation measures are required for terrestrial land cover, soils, geology, and hydrogeology as the work are deemed to have negligible to minor impacts.
Chapter 7 Water	
Impact on Water Quality Occurrence of flooding	• All plant shall be cleaned and checked twice daily for leaks or drips before entering the site. • No plant machinery is to be filled with more than 3/4 fill with fuel. • The contractor's site compound is where all refuelling on site will take place. • Prior to entering the site all plant shall be cleaned and checked twice daily for leaks or drips. • Refuelling will take place, where possible, remote from the site and within suitable oil receptors. • Any refuelling on site will take place at the Contractor's site compound. • All oil / fuel at the compound will be adequately stored to ensure that any potential spill is contained and treated on site and that none can reach any drainage system or the River Shannon. • A spill response kit will be available onsite and accessible to all to control pollution incidents. These spill kits will contain absorbent pads, absorbent granules and methods of disposal of materials and used kit. These kits will be located at appropriate points around the Site which are considered to be at a higher risk of pollution (e.g., refuelling area and next to fuel tanks). Further spill

Potential Impact	Summary of Proposed Mitigation
	kits and supplies will be located in the stores within the Site, where replacements for used kits will be found. • Spill kits will need be regularly inspected and immediately replaced if used. • Toolbox talks will be communicated to Site staff and contractors so that they are fully informed of refuelling procedures.
Chapter 8 BIODIVERSITY	
Impact on Designated Sites Impact on Marine Mammals Impact on Benthic Ecology/ Marine Habitats Impact on Fish	• Effects on two of the European sites scoped into the appraisal cannot be excluded as further evaluation and analysis is required. This includes not only proposed project alone but should be used in combination with the other projects considered. • For marine mammals, mitigation measures include: a 500m radial distance sound source in water depths of <200m on commencement of works as recommended by National Parks and Wildlife Service (NPWS). • Further information is found in NPWS's *'Guidance to Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters' and* should be adhered to. • Statistic Acoustic Monitoring is recommended to ensure bottlenose dolphin activity at the site is not affected. This should be undertaken after works are completed. • Only **Minor** impacts will affect benthic ecology and no mitigation measures are recommended for shellfish waters as the proposed works were deemed to only have **Negligible** impacts on shellfish habitats and related receptors in the area.
Chapter 10 AIR QUALITY	
Impact on Air Quality	• For air quality, mitigation measures for the proposed works were deemed to only have Negligible impacts on receptors in the area.
Chapter 11 NOISE	
Impact of Noise	• No mitigation measures are recommended for terrestrial noise as the proposed works were deemed to only have **Negligible** impacts on receptors in the area. • For marine mammals the following mitigation measures are recommended; It is recommended by the National Parks and Wildlife Service (NPWS), a 500m radial distance sound source in water depths of <200m on commencement; NPWS's *'Guidance to Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters'* should be adhered to; and, Statistic Acoustic Monitoring is recommended throughout the marine site for a period after works are completed to ensure bottlenose dolphin activity at the site is not affected.
Chapter 12 LANDSCAPE AND SEASCAPE	
Impact of marine plant on landscape and visual	• There will be a temporary short-term impact of the presence of marine plant while the SI works are being carried out. The SI works are not expected to have any permanent impact on the landscape and visual aspects of the surrounding area. This is due to the work being carried out on the seabed of Shannon Estuary.

Potential Impact	Summary of Proposed Mitigation
	• Overall, the sensitivity of the receptor is **Negligible**, and the magnitude of the impact is **Negligible**. • No mitigation measures are recommended for landscape & visual as the proposed works were deemed to only have **Negligible** impacts on receptors in the area.
Chapter 11 ARCHAEOLOGY & CULTURAL HERITAGE	
Potential discovery of material Archaeological/historical significance Impacts on cultural heritage	• An archaeological survey and terrestrial, intertidal, and underwater assessment are to be conducted for the Deepwater terminal project. This includes a marine geophysical survey to detect potential anomalies or features of archaeological significance. • If features are detected, they are to be avoided following pre-disturbance inspection. • Archaeological monitoring of site is recommended (Section 5 of National Monuments Act (2004 Amendment) to be conducted by licenced and experienced maritime personnel. Monitoring of riverbed and intertidal disturbances will be carried out during works. • Marine works should include a timescale which should be made available to archaeologist with sufficient notice. • Licence applications should be in place in advance of commencement of SI works • In the event of discovery of archaeological material, all geotechnical work should cease in the immediate area to allow archaeologist to record any such material. • A suitable archaeological team are to be on standby at the site to inspect the material. If the material is of archaeological significance, such material is to be removed. • Where excavation is required secure site offices should be provided. • Cost of excavation, post-excavation analysis and conservation testing should be made available
Chapter 12 MATERIAL ASSETS	
Impact of site works on traffic and transport Disturbance of utilities in area Coastal Processes – impact on tidal flows, waves, and sediment transport Shellfish Waters – proximity of works to shellfish waters	• There are no recommended mitigation measures as the works will be carried out on the Shannon Estuary. The impacts on the receptor are Negligible and the magnitude of the impact is Negligible. Overall, the significance of the Impacts is negligible. • No mitigation measures are recommended for utilities as the proposed works were deemed to only have **Negligible** impacts on receptors in the area. • No mitigation measures are recommended for coastal processes as works will have a M**inor** impact. • No mitigation measures are recommended as works are taking place far from designated foreshore licence area. Only **Negligible** impacts on shellfish habitats and related receptors.
Chapter 13 SHIPPING AND NAVIGIATION	
Injury and/or death of staff undertaking the marine SI;	• Effective communication between sampling staff, port staff, and ship operators will be prioritised to always ensure safety for the duration of the SI works.

Potential Impact	Summary of Proposed Mitigation
Injury and/or death of port staff or crew of ship; Collision of sampling vessels and other vessels Sampling vessels running aground Striking or disruption of utilities (e.g., gas mains, electricity cables, water mains) under the seabed during borehole drilling.	• In the unlikely event of each of the following impacts appropriate planning, mitigation and safety procedures will be implemented • It has been determined that the sensitivity of the receptor is **Medium**, and the magnitude of the impact is **Medium**. Therefore, A marine notice will there is expected to be **Moderate** impacts. • A Marine Notice will be issued prior to any marine SI works to make operators aware of safety procedures. The Marine SI contractor will have all necessary health and safety procedures in place before commencement of marine SI works.
Chapter 15 POPULATION AND HUMAN HEALTH	
Population and Human Health	• The proposed works are deemed to only have **Negligible** impacts on Population and Human Health and related receptors in the area which do not require mitigation measures.

23 CONCLUSION

This AIMU report has provided responsible authorities with objective information on which to assess the environmental effects of the marine SI works to support the planning and preliminary engineering design of the Foynes Deep Water Berth Development on Foynes Island. The report has included the current state of the environment in the vicinity of the proposed activity / works, the possible effects of the activity / works on the environment and to highlight how mitigation will be implemented to minimise these impacts.

A number of impacts have been identified which are summarised in Table 23.1. This table includes the pre-mitigation, post-mitigation and cumulative impacts expected to arise from the proposed activity / works.

Table 23.1: Summary of expected impacts from the Marine SI works at Foynes Port and Island

Chapter Title	Sub-Title	Pre-Mitigation Impact	Post Mitigation Impact	Cumulative Impacts
Population & Human Health	-	Negligible	N/A	N/A
Biodiversity	***Designated / European Sites***	Moderate	TBC on completion of Appropriate Assessment	
	Marine Mammals	Minor to Moderate	Negligible to Minor	Slight
	Benthic Ecology / Marine Habitats	Minor	Negligible	Not Significant
	Fish	Negligible	Negligible	Not Significant
Land, Soils, Geology & Hydrogeology	***Marine***	Negligible to Minor	N/A	N/A
	Terrestrial	Negligible	N/A	N/A
Water	***Flooding***	Negligible	N/A	N/A
	Water Quality	Moderate	Minor	Slight
Air, Climate & Noise	***Air Quality***	Negligible	N/A	N/A
	Terrestrial Noise	Negligible	N/A	N/A
	Underwater Noise	Moderate	Minor	Minor
Landscape & Visual	-	Negligible	N/A	N/A
Archaeology & Cultural Heritage	-	Moderate	Minor	Slight
Material Assets	***Traffic & Transport***	Negligible	N/A	N/A
	Utilities	Negligible	N/A	N/A
	Coastal Processes	Minor	Negligible	Not Significant
	Shellfish Waters	Negligible	N/A	N/A
Shipping & Navigation	-	Moderate	Minor	Slight
Major Accidents & Disasters	-	Moderate	Minor	Slight

As shown in the table above, the most significant effects pre-mitigation is to Designated / European Sites, Marine Mammals, Water Quality, Underwater Noise, Shipping & Navigation and Major Accidents & Disasters, which all have a **Moderate** significance pre-mitigation.

Mitigation measures were recommended for all effects that had a greater than **Negligible** impact on the surrounding environment. Recommended mitigation measures range from distribution Marine Notices to following the guidance "*Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters"*, acoustic monitoring and spill and pollution control. Following implementation of all the recommended mitigation measures, all identified effects will be reduced to either **Minor** or **Negligible** significance.

It should be noted that all impacts identified are **Temporary** in nature, and the site is expected to return to baseline conditions after the marine SI works are completed.

The cumulative assessment did not find any significant effects that may arise from interactions between the proposed marine SI works and other identified projects in the area. The most significant effects would be **Minor** in nature.

Therefore, it can be concluded that the proposed marine SI works will not have any significant impacts on the surrounding environment subject to Appropriate Assessment (including consideration of mitigation measures and in combination effects).

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Appendix A – National Marine Planning Framework (NMPF) (2021) Compliance

MAKING COMPLEX EASY

A TETRA TECH COMPANY

FOYNES ISLAND MARINE SITE INVESTIGATION

Report on National Marine Planning Framework Compliance

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F02
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Document status

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Contents

1 INTRODUCTION

Shannon Foynes Port Company (SFPC) is applying to the Marine Area Regulatory Authority of the Department of Housing, Local Government and Heritage to undertake marine site investigation works. The works to be carried out in the proposed Maritime Usage Area will enable SFPC to determine the conditions at the site and support the development of the proposed Deep-Water Berth on Foynes Island and access bridge from Foynes Port to the south-east corner of Foynes Island. This development will support SFPC's plan for delivering offshore renewable energy, as outlined in the Vision 2041 Strategic Review 2022.

The site proposed for the investigation works is in the Shannon Estuary, immediately adjacent to Foynes Port and Foynes Island.

The timing for the survey programme is designed to ensure that the proposed Deep-Water Berth and access bridge is positioned to support the development of Offshore Renewable Energy. The value of proposed offshore renewable energy in Irish coastal waters is in the order of seven billion euro, which aims to tap into one of the most energetic offshore wind resources in the world, with the potential to yield higher power levels than other European countries. Therefore, there are significant opportunities associated with offshore renewable energy projects in manufacturing, construction, installation, operation, and maintenance. Ports have significant potential to support this industry and play a key role in supplying offshore renewable energy to the Irish market.

This document details how this Maritime Area Usage Licence Application and associated investigation works facilitate and are consistent with the National Marine Planning Framework (NMPF) (2021).

This statement should be read in conjunction with the accompanying documentation enclosed within this Maritime Area Usage Licence Application.

2 NATIONAL MARINE PLANNING FRAMEWORK

The National Marine Planning Framework (NMPF) was published on 30th June 2021 and brings together all marine-based human activities for the first time, outlining the government's vision, objectives and marine planning policies for each marine activity.

The NMPF details how these marine activities will interact with each other in an ocean space that is under increasing spatial pressure, ensuring the sustainable use of our marine resources to 2040.

The NMPF is intended as the marine equivalent to the National Planning Framework. This approach will enable the Government to:

- set a clear direction for managing our seas
- clarify objectives and priorities
- direct decision makers, users and stakeholders towards strategic, plan-led, and efficient use of our marine resources

The NMPF has been prepared with an ecosystem-based approach and informed by best available knowledge. As part of the preparation of the NMPF, a Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) have been carried out.

The Policy Objectives for Ports, Harbours and Shipping is set out in Chapter 18 and the Policy Objectives for Offshore Renewable Energy is set out in Chapter 13 of the NMPF.

This document sets out how the Foynes Island Marine Site Investigation is compliant with the overall objectives of the NMPF and its relevant planning policies.

3 COMPLIANCE WITH NMPF OVERALL OBJECTIVES

3.1 Overall Objectives Description

The high-level objectives laid out in the NMPF in relation to Port Development and Offshore Renewable Energy (ORE) are set out below:

- Safeguard the operation of ports as key actors in the economic wellbeing of the State through the provision of safe and sustainable maritime transport.
- Facilitate a competitive and effective market for maritime transport services.
- Sustainable development of the ports sector and full realisation of the National Ports Policy with a view to providing adequate capacity to meet present and future demand, and to adapt to the consequences of climate change.
- Ensure that the strategic development requirements of Tier 1 and Tier 2 Ports, ports of regional significance, and smaller harbours are appropriately addressed in regional and local marine planning policy.
- To make Ireland a leader in climate action through reaching ORE targets;
- To increase the sustainable ORE use of our extensive marine resource;
- To support Ireland's decarbonisation journey through increased use of ORE; and
- To provide enhanced security of supply.

3.2 SFPC Compliance with NMPF Overall Objectives

This application relates to permission to carry out site investigation surveys which will inform the design of the Deep-Water Berth and access bridge at Foynes Island which will support SFPC's plan for delivering offshore renewable energy, as outlined in the Vision 2041 Strategic Review 2022. Therefore, this will be vital in delivering Ireland's 2030 decarbonisation targets through supporting the construction and later operation and maintenance of offshore renewable energy, while also bringing economic and social benefits to local coastal communities and to the wider County Limerick area.

4 COMPLIANCE WITH NMPF PLANNING POLICIES

The Planning Policies for ORE and Ports, Harbours and Shipping are set out in Chapters 13 and 18 respectively.

There are 11 planning policies which directly relate to the Foynes Island site investigation works. These policies are set out below.

4.1 Ports, Harbours and Shipping Policy 1

4.1.1 Policy Description

To provide for shipping and freedom of navigation the following factors will be taken into account when reaching decisions regarding development and use:

- The extent to which the locational decision interferes with existing or planned routes used by shipping, access to ports and harbours and navigational safety. This includes commercial anchorages and approaches to ports as well as key littoral and offshore routes;
- A mandatory Navigation Risk Assessment;
- Where interference is likely: whether reasonable alternatives can be identified; and
- Where there are no reasonable alternatives: whether mitigation through measures adopted in accordance with the principles and procedures established by the International Maritime Organisation can be achieved at no significant cost to the shipping or ports sector.

4.1.2 SFPC Compliance with NMPF Ports, Harbours, and Shipping Planning Policy 1

This application is for site investigations only and the results will be used to inform the detailed design and precise location of the Foynes Deep Water Berth and access bridge. SFPC is also the owner of the existing port facilities and therefore, SFPC are familiar with the existing access routes to the port which will be maintained throughout. A Navigation Risk Assessment will be provided as part of the EIAR for the port development once the full extent of the new port design is known. It will be submitted to An Bord Pleanala as part of an application for planning permission under the Strategic Infrastructure Development provisions of the Planning and Development Act 2000, as amended at the appropriate time.

The site investigation works proposed are consistent and compliant with Ports, Harbours and Shipping Policy 1, which indicates that the application should be supported.

4.2 Ports, Harbours and Shipping Policy 2

4.2.1 Policy Description

Proposals that may have a significant impact upon current activity and future opportunity for expansion of port and harbour activities should demonstrate that they will, in order of preference:

a) avoid,

b) minimise, or

c) mitigate significant adverse impacts, and

d) if it is not possible to mitigate significant adverse impacts on current activity and future opportunity for expansion of port and harbour activities, proposals should set out the reasons for proceeding.

4.2.2 SFPC Compliance with NMPF Ports, Harbours and Shipping Planning Policy 2

This is an application for site investigations only, however the applicant is also the operator of the existing Foynes Port, and the design of the new Foynes Deep Water Berth and access bridge is intended to be complementary to the existing port facilities and operations. It is intended to design the facility to avoid any significant adverse impacts to current activity or future opportunity of the port. The site investigations are required in order to ensure that this is achieved.

The site investigation works proposed are consistent and compliant with Ports, Harbours and Shipping Policy 2, which indicates that the application should be supported.

4.3 Ports, Harbours and Shipping Policy 3

4.3.1 Policy Description

Proposals that may have a significant impact upon current activity and future opportunity for expansion of port and harbour activities must demonstrate consideration of the National Ports Policy, the National Planning Framework, and relevant provisions related to the TEN-T network.

4.3.2 SFPC Compliance with NMPF Ports, Harbours and Shipping Planning Policy 3

Please see *SPFC Compliance with Ports, Harbours and Shipping Policy 2* above.

4.4 Ports, Harbours and Shipping Policy 4

4.4.1 Policy Description

Proposals within ports limits, beside or in the vicinity of ports, and / or that impact upon the main routes of significance to a port, must demonstrate within applications that they have:

- been informed by consultation at pre-application stage or earlier with the relevant port authority;
- have carried out a navigational risk assessment including an analysis of maritime traffic in the area; and
- have consulted Department of Transport, MSO and Commissioners of Irish Lights.

Applicants must continue to engage parties identified in pre-application processes as appropriate during the decision-making process.

4.4.2 SFPC Compliance with NMPF Ports, Harbours and Shipping Planning Policy 4

This application is for site investigations only and the results will be used to inform the detailed design of the Foynes Deep Water Berth and access bridge. SPFC is also the owner of the existing port facilities and therefore SFPC are familiar with the existing access routes to the port which will be maintained throughout. A Navigation Risk Assessment will be provided as part of the EIAR for the port development once the full extent of the new port design is known. It will be submitted to An Bord Pleanala as part of an application for planning permission under the Strategic Infrastructure Development provisions of the Planning and Development Act 2000, as amended at the appropriate time.

The Department of Transport are aware of the application for site investigations and of the future plans for development. A Stakeholder Management Plan is currently being developed. Under that plan SFPC intends to undertake engagement with both the MSO and the Commissioners of Irish Lights in the coming weeks and months as well as engagement with a broad range of stakeholders.

The site investigation works proposed are consistent and compliant with Ports, Harbours and Shipping Policy 4, which indicates that the application should be supported.

4.5 Ports, Harbours and Shipping Policy 6

4.5.1 Policy Description

In areas of authorised dredging activity, including those subject to navigational dredging, proposals for other activities will not be supported unless they are compatible with the dredging activity.

4.5.2 SFPC Compliance with NMPF Ports, Harbours and Shipping Planning Policy 6

This application is for site investigations only and the proposed activities will not conflict with any authorised dredging activity.

The site investigation works proposed are consistent and compliant with Ports, Harbours and Shipping Policy 6, which indicates that the application should be supported.

4.6 Ports, Harbours and Shipping Policy 8

4.6.1 Policy Description

Proposals that cause significant adverse impacts on licensed disposal areas should not be supported. Proposals that cannot avoid such impact must, in order of preference

a) minimise,

b) mitigate, or

c) if it is not possible to mitigate the significant adverse impacts, proposals must set out the reasons for proceeding.

4.6.2 SFPC Compliance with NMPF Ports, Harbours and Shipping Planning Policy 8

This application is for site investigations only and the proposed activities will not conflict with any licensed disposal area.

The site investigation works proposed are consistent and compliant with Ports, Harbours, and Shipping Policy 8, which indicates that the application should be supported.

4.7 ORE Policy 1

4.7.1 Policy Description

Proposals that assist the State in meeting the Government's offshore renewable energy targets, including the target of achieving 5GW of capacity in offshore wind by 2030 and proposals that maximise the long-term shift from use of fossil fuels to renewable electricity energy, in line with decarbonisation targets, should be supported. All proposals will be rigorously assessed to ensure compliance with environmental standards and seek to minimise impacts on the marine environment, marine ecology, and other maritime users.

4.7.2 SFPC Compliance with NMPF ORE Planning Policy 1

The site investigation works being applied for in the proposed Maritime Usage Area Licence Application are being carried out with a view to supporting and informing SFPC's plan for delivering Offshore Renewable Energy, as outlined in the Vision 2041 Strategic Review 2022. This facility will ensure that the staging port used for construction is based in Ireland maximising the value of offshore wind to Ireland and reducing the Levelised Cost of Energy for offshore wind and therefore reducing the cost of offshore wind subsidies for the consumer.

The site investigation works proposed are consistent and compliant with ORE Policy 1, which indicates that the application should be supported.

4.8 ORE Policy 2

4.8.1 Policy Description

Proposals must be consistent with national policy, including the Offshore Renewable Energy Development Plan (OREDP) and its successor. Relevant Projects designated pursuant to the Transition Protocol and those projects that can objectively enable delivery on the Government's 2030 targets will be prioritised for assessment under the new consenting regime. Into the future, areas designated for offshore energy development, under the Designated Marine Area Plan process set out in the Maritime Area Planning Bill, will underpin a plan-led approach to consenting.

4.8.2 SFPC Compliance with NMPF ORE Planning Policy 2

This is an application for site investigations to inform the design of a port facility to support the development of offshore renewable energy. The survey work will inform the design of a potential deep-water berth and access

bridge that could assist the delivery of the Government's 2030 targets, aligning with National Policy outlined in the Programme for Government (2020) and Climate Action Plan (2021), among others.

The site investigation works proposed are consistent and compliant with ORE Policy 2, which indicates that the application should be supported.

4.9 ORE Policy 6

4.9.1 Policy Description

Proposals for infrastructure enabling local use of excess energy generated from emerging marine technologies (wave, tidal, wind) should be supported.

4.9.2 SFPC Compliance with NMPF ORE Planning Policy 2

The site investigation works being applied for in the proposed Maritime Usage Area Licence Application are being carried out with a view to supporting and informing SFPC's plan for delivering Offshore Renewable Energy, as outlined in the Vision 2041 Strategic Review 2022.

The site investigation works proposed are consistent and compliant with ORE Policy 11, which indicates that the application should be supported.

4.10 ORE Policy 7

4.10.1 Policy Description

Where potential for ports to contribute to ORE is identified, plans and policies related to this port must encourage development in such a way as to facilitate ORE and related supply chain activity.

4.10.2 SFPC Compliance with NMPF ORE Planning Policy 7

The site investigation works being applied for in the proposed Maritime Usage Area Licence Application are being carried out with a view to supporting and informing SFPC's plan for delivering Offshore Renewable Energy, as outlined in the Vision 2041 Strategic Review 2022. This facility will ensure that the staging port used for construction is based in Ireland maximising the value of offshore renewable energy to Ireland and reducing the Levelised Cost of Energy for offshore wind and therefore reducing the cost of offshore wind subsidies for the consumer.

The site investigation works proposed are consistent and compliant with ORE Policy 7, which indicates that the application should be supported.

4.11 ORE Policy 11

4.11.1 Policy Description

Where appropriate, proposals that enable the provision of emerging renewable energy technologies and associated supply chains will be supported.

4.11.2 SFPC Compliance with NMPF ORE Planning Policy 11

The site investigation works being applied for in the proposed Maritime Usage Area Licence Application are being carried out with a view to supporting and informing SFPC's plan for delivering Offshore Renewable Energy, as outlined in the Vision 2041 Strategic Review 2022.

The site investigation works proposed are consistent and compliant with ORE Policy 11, which indicates that the application should be supported.

5 CONCLUSION

The proposed Foynes Island Marine Site Investigation is fully compliant with both the relevant objectives of the NMPF and its associated Planning Policies.

Appendix B - Pre-application Consultation Responses

An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage

Your Ref: Foynes Island Project
Our Ref: G Pre00336/2022 (Please quote in all related correspondence)

21 March 2023

RPS Group
Innishmore
Ballincollig
Co Cork

Via email: Ruth.Barr@rpsgroup.com

Proposed Pre Planning Development: SFPC.: Marine Site Investigation as part of Foynes Island Project: Foynes Island, Foynes, Co Limerick

A chara

I refer to correspondence received in connection with the above. Outlined below are heritage-related observations/recommendations co-ordinated by the Development Applications Unit under the stated headings.

Archaeology (Underwater)
The submitted documents have been reviewed by the Underwater Archaeology Unit of the National Monuments Service of the Department of Housing, Local Government and Heritage, who are charged, on behalf of the Minister, with assessing potential development impacts on underwater archaeology by making recommendations to the relevant planning authorities, consultees and other regulatory bodies on developments which have the potential to impact on underwater archaeology. It is noted that the proposed Marine Site Investigation areas are situated at or in relation to the Recorded Monument LI010-001----, which is subject to statutory protection in the Record of Monuments and Places established under Section 12 of the National Monuments (Amendment) Act 1930-2014. Under Section 12(c) of the National Monuments (Amendment) Act 1994 any person (including a landowner) proposing to carry out, or to cause or to permit the carrying out of, any work at or in relation to a Recorded Monument must give notice in writing to the Minister for Housing, Local Government and Heritage two months before commencing that work. Receipt of this pre planning consultation is regarded as compliance with the Section 12 requirements.

It is also noted that the Wreck Inventory of Ireland includes the protected wreck W10603 in the proposed survey area and further entries for losses in the environs of the proposed development area. It should be noted, also, that although over 18,000 wrecks have been recorded in the Wreck Inventory of Ireland to date from Irish waterways and the marine environment, ranging from small fishing boats, dugout canoes and coastal traders to steamships and ocean going ships, the Inventory is largely based on documentary sources

available from after AD 1700. As such, previously unrecorded wreck sites, including those dating to earlier periods, may await discovery in the area under consideration here. Section 3 of the National Monuments (Amendment) Act 1987 is the primary piece of legislation that protects wrecks over 100 years old and archaeological objects underwater irrespective of age. Wrecks that are less than 100 years old and archaeological objects or the potential location of such a wreck or archaeological object can also be protected under Section 3 of the 1987 (Amendment) Act. It is the overarching policy of this Department, as outlined in the document *Frameworks and Principles for the Protection of the Archaeological Heritage*, to preserve in situ archaeological materials, including those found underwater and, if identified they may require the institution of exclusion zones and buffers to facilitate their protection in the course of the proposed works.

In light of the above it the recommendation of this Department that an Underwater Archaeological Impact Assessment report be undertaken for submission

Archaeological Recommendations

1. The geophysical surveys shall be licenced under the National Monuments Acts 1930-2014 (Dive/Survey Licence (Section 3 1987 National Monuments Act) and Detection Device consent (Section 2 1987 National Monuments Act)). Licence applications, to be prepared by a suitably experienced project archaeologist, accompanied by Method Statements, shall be sent for vetting to the Department and no surveys shall be undertaken until licences have been approved.
2. The proposed geophysical surveys shall be carried out in advance of any geotechnical works in order to ensure all attendant potential impacts to the underwater cultural heritage are avoided.
3. Following the geophysical survey programme an Underwater Archaeological Impact Assessment (UAIA) report containing a desk study and archaeological interpretation of the surveys shall be forwarded to the Department, for review and approval. The UAIA shall include the following:
    a. An overview of the results of geophysical survey data sets by a suitably qualified and experienced archaeologist, to ensure that proposed geotechnical works do not negatively impact on locations where there is known or potential archaeology, including wrecks, underwater archaeological objects or submerged landscapes. The archaeologist should also be suitably experienced, with a track record in dealing with and the interpretation of marine geophysical data for archaeological purposes, including ensuring that datasets are of sufficient specification for the identification of underwater cultural heritage, including wrecks and submerged landscapes.

b. Once geophsyical surveys have been completed, the full information should be compiled into a UAIA report and submitted to the Department for review and further comment, prior to undertaking any invasive works, including geotechnical investigations. The UAIA report should contain a detailed Archaeological Impact Statement that addresses all identified and potential adverse impacts on underwater archaeological heritage and should also make recommendations on mitigation measures to avoid or mitigate all impacts. Potential secondary or indirect impacts, such as access roads or construction works to facilitate access to the waterways, for example, shall also be included. Where archaeological materials/features including wrecks, underwater archaeological objects or submerged landscapes are shown to be present, preservation in situ by avoidance will be required. Where it is demonstrated that adverse impacts cannot be avoided by the works, then the UAIA report shall include a comprehensive archaeological mitigation strategy, to be agreed with the Department, that sets out the mitigation measures that promote the maximum preservation in situ of underwater cultural heritage through avoidance of impacts, archaeological test-excavations, preservation by record (archaeological excavation) or archaeological monitoring. All resulting and associated archaeological costs shall be borne by the developer. The developer shall be prepared to be advised by the Department in this regard or in regard to any subsequent recommendations that may issue.

Nature Conservation

The proposed development may be within and adjacent to several Natura sites. These sites are designated for a range of habitats, communities and species. In addition, there are designations under national legislation and under international agreements within a distance of the proposed development. The proponents should ensure they map the development and the likely direct and indirect impacts that could arise to those sites or species of conservation interest

Natura Impact Statement

According to Article 6(3) of Council Directive (92/43/EEC) (the Habitats Directive) any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. The provisions of this article have been transposed into the Irish Statute by Regulation 42 of the European Communities (Birds and Natural Habitats) Regulations (SI 477 of 2011).

Details of the site synopses and qualifying interests of Natura sites are available on http://www.npws.ie/protected-sites. Further information related to site specific conservation objectives are also available at this location by interrogating the Site Code (as in first paragraph). Additional supporting information and referenced publications are also available to download from this resource. Site boundaries and mapped habitat resources are available to download from http://www.npws.ie/maps-and-data. The proponent should pay particular

attention to the conservation objectives framed around the Area, Range, Structure & Function and Future Prospects for each qualifying interest. It might also be useful to review recent case law surrounding the development of Article 6 of the Habitats Directive and in particular the application of conservation objectives for Natura sites.

In order to fulfil the Article 6 legal requirements the following information should be supplied within the application in relation to Annex I habitats and Annex II species:

A. Full description of proposed operation/activity

- A full and finalised description of the proposed methodology including the likely time-scale of works. It is not currently clear what level of interaction would occur within or adjacent to European designations.
- Are there similar operations/activities already in the locality? If existing operations/activities occur adjacently then a justification for additional facilities should be included. Would the proposed works act in conjunction with any existing or planned developments?
- The facilities or licensing to be put in place to cope with both biological and industrial waste (*e.g.* extracted drill materials, *etc*.) generated during the proposed survey work should be detailed. Detailed contingency plans sufficient to address potential negative interactions with the marine environment *e.g*. oil spills.

B. Baseline description of relevant environment

- A description of the biological environment over which the activity would impact, including the marine and terrestrial flora and fauna, must be included if work is envisaged within or in proximity to Nature sites.
- The design and duration of ecological surveys should be sufficient to evaluate the potential impacts through all stages of the year.
- Consideration should be given to whether the likely works would result in disturbance or loss to Annex I or Annex II qualifying interests in Special Areas of Conservation or to bird species in Special Protected Areas. Any loss or interruption of normal processes must be quantified relative to the entire designated area not just within the direct footprint of development.
- The proponent must ensure that the survey or construction operations are compliant with "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters". The latest version of this document was published in January 2014 and is available to download from http://www.npws.ie/marine/bestpracticeguidelines/. This may be a useful document in framing mitigating measures that may be required.

It must be noted that all cetaceans are listed under Annex IV (including those in Annex II) of Council Directive 92/43/EEC (the Habitats Directive). Accordingly, under Article 12 of that

Directive, it is an offence to deliberately capture, disturb or kill a cetacean or take actions that result in deterioration or destruction of their breeding sites or resting places. This has been transposed into Irish Law by Regulation 51 of the European Communities (Birds and Natural Habitats) Regulations. Introduction of certain sound sources into the marine environment, as may result from construction or surveys (*e.g*. geophysical survey) over the foreshore, have the potential to cause injury and possibly mortality in these species. All marine mammals are protected wild animals under the Fifth Schedule, which includes all cetacean and seal species, of the Wildlife Act (39 of 1976) and Amendments. Under Section 23 (as amended in 2000), it is an offence to kill, injure or wilfully interfere with or destroy the breeding place or resting place of any protected wild animal.

The proponent should note that it is recommended that they should apply at earliest opportunity for a Regulation 54 consent to wildlifelicence@npws.gov.ie to ensure that activities can be appropriately considered in terms of the potential for disturbance that may arise from their proposed site investigations. The supporting ecological and environmental information furnished in the current application are likely to contain a significant proportion of that required for this assessment.

The above observations and recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by the planning authority, in his role as statutory consultee under the Planning and Development Act 2000, as amended.

You are requested to send further communications to the Development Applications Unit (DAU) at **manager.dau@npws.gov.ie**.

Is mise le meas**,**

Diarmuid Buttimer
Development Applications Unit
Administration

From:	Stephen Riordan (Transport)
To:	Ruth Barr
Subject:	RE: Foreshore Application for Marine Site Investigation on behalf of Shannon Foynes Port Company
Date:	02 February 2023 10:51:12

Good day Miss Barr,

Thank you for your enquiry with regards to proposed development of Foynes Island by SFPC.

Any comments with regards to the (any) foreshore licence application shall be addressed to the foreshore housing department when requested by them.

Regards,

Capt. Stephen Riordan
Nautical Surveyor
Marine Survey Office

An Roinn Iompair
Department of Transport

Lána Líosain, Baile Átha Cliath, D02 TR60
Leeson Lane, Dublin, D02 TR60

Office + 353 1604 1604
Monile +353 085 8624632

Stephenriordan@transport.gov.ie
www.gov.ie/transport

From: Ruth Barr <Ruth.Barr@rpsgroup.com>
Sent: Tuesday 24 January 2023 08:45
To: Alan Quinn (Transport) <Alan.Quinn@transport.gov.ie>
Subject: Foreshore Application for Marine Site Investigation on behalf of Shannon Foynes Port Company

Dear Captain Quinn,

We wish to consult with the Marine Survey Office regarding the above proposed project. Please find attached relevant information. If you require any further detail please let me know.

Yours sincerely
For RPS

Ruth Barr

Ruth Barr
Technical Director - Water Environment and Flood Risk Management
RPS | Consulting UK & Ireland
T +44 2890 667 914
E ruth.barr@rpsgroup.com

From: SFPA Applications
To: Ruth Barr
Subject: RE: Foreshore Application for Marine Site Investigation on behalf of Shannon Foynes Port Company
Date: 24 January 2023 11:24:02

Good morning, Ruth,

Thank you for inviting the Sea Fisheries Protection Authority (SFPA) to comment on your scoping exercise. However, the SFPA are not the decisionmakers in relation to foreshore licenses. Our role is to provide advice to the Minister for Agriculture, Food and the Marine on the possible impact (if any) of proposed developments on wild fisheries, shellfish growing areas, seafood safety if requested to do so. The emphasis of any advice would be on implications for the SFPA in conducting official controls and possible non-compliance issues that could arise. Therefore we are not in a position to review the report. However, the application may be reviewed when the foreshore application is presented to DAFM for consideration, and they forward it on to the SFPA at that point for comment.

Kind regards,
Maebh McGuinness

Applications Team
SFPA: Food and Fisheries Support Unit
Office +353 (0)23 8859300
Email applications@sfpa.ie

AN t-ÚDARÁS UM CHOSAINT IASCAIGH MHARA | SEA-FISHERIES PROTECTION AUTHORITY

An t-Údarás um Chosaint Iascaigh Mhara, Clogheen, Cloich na Coillte, Chorcaí
Head Office, National Seafood Centre, Park Road, Clogheen, Clonakilty, Co. Cork
Eircode: P85TX47 **www.sfpa.ie**
SFPA Confidential Line **1890 76 76 76 or use this confidential reporting form**

From: Ruth Barr <Ruth.Barr@rpsgroup.com>
Sent: Tuesday 24 January 2023 08:25
To: SFPA_Info <sfpa_info@sfpa.ie>
Subject: Foreshore Application for Marine Site Investigation on behalf of Shannon Foynes Port Company

Dear Manager,

We wish to consult with the Sea Fisheries Protection Authority regarding the above proposed

project. Please find attached relevant information. If you require any further detail please let me know.

Yours sincerely
For RPS

Ruth Barr

Ruth Barr
Technical Director - Water Environment and Flood Risk Management
RPS | Consulting UK & Ireland
T +44 2890 667 914
E ruth.barr@rpsgroup.com

COMHAIRLE CONTAE AN CHLÁIR | CLARE COUNTY COUNCIL

Clare County Council
New Road,
Ennis,
Co. Clare
13th February 2023

By email to: ruth.barr@rpsgroup.com

SFPC – Marine Site Investigations Foynes Island
RPS
74 Boucher Road,
Belfast
Co. Antrim BT12 6RZ

SFPC Marine Site Investigations Foynes Island Consultation

A Chara,

On behalf of Clare County Council, I welcome this opportunity to input into the consultation process associated with the Marine Site Investigations to inform the engineering design of the Foynes Island Project. The goal of this project in delivering Floating Offshore Wind is in line with the commitments in the Climate Action Plan 2023 which recommits our ambition to install 7GW of offshore wind capacity in our maritime area by 2030. As a Local Authority we fully support this ambition and the importance of transitioning our electricity supply to achieve a carbon neutral economy by 2050.

Clare County Council welcomes the undertaking of these site investigations to inform the associated Foreshore Licence Application which can deliver on this target by 2030 and are keen to support and work with all stakeholders in realising this maritime potential. We wish to emphasise however, that this 7GW is not a cap and the actual potential goes beyond this with the target of at least 7GW being key. In this regard, we feel the importance of not only considering the opportunities around Floating Offshore Wind is key but also green hydrogen and green ammonia production.

Clare County Council, at Local Government level, sees the vital importance of long-term forward planning for Ireland's maritime environment given the interface with the terrestrial land-based planning which we currently undertake. This interface has largely been ignored in the past and is now a critical space which we need to future proof. As a Local Authority we were and continue to be at the forefront of forward planning for the interaction of maritime and the terrestrial area through our leadership in the preparation and implementation of the *Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary.* Clare County Council recognises the significant economic benefit this sector can bring to not only the county but to the region and to Ireland as a whole. The development of a supply chain to accompany this emerging technology and the ability to capitalise on the turbine supply chain benefits within this interface with the marine environment from this industry is immense.

Policy support

The proposal is consistent with the vision of Clare County Council for the Shannon Estuary as expressed in our planning policy document the *Clare County Development Plan 2017-2023* and the *draft Clare County Development Plan 2023-2029* together with the *Clare Renewable Energy Strategy*. Moreover, the project aligns with regional objectives regarding the Shannon Estuary as set out in the *Strategic Integrated Framework Plan for the Shannon Estuary*. Our County Development Plan contains key objectives relating to the enabling infrastructure required along the West Clare coastline to facilitate the manufacturing, assembly and operation of floating turbine foundations used in these Offshore Wind farms. At a national level the support for Hybrid Connections as identified in the Climate Action Plan will be key to minimising grid reinforcement. Clare County Council recognises the significant lead in time required to realise floating offshore wind projects and it is in this regard any site investigations undertaken at this stage in the process by SFPC should not only focus on the direct footprint of the proposed project or development, but also within the wider catchment of the Shannon Estuary. This is particularly relevant given the requirements in terms of Appropriate Assessment to prove no risk of adverse effects, which is assessed against in this case the Conservation Objectives for the Lower River Shannon cSAC, and therefore will require an assessment of the potential impacts at a population level in terms of species together with the associated habitats. This will allow the lead in time to 2030 to be utilised to develop this key supply chain sector.

Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary

In formulating the programme of site investigations and indeed the application for a foreshore licence given the site is identified as a Strategic Development Location within the SIFP the project will be subject to 3 levels of mitigation arising from the Natura Impact Report and the SEA process as follows associated with Volume 2 Appendices:

- Over-arching mitigation Table 2.2 and 3.1 (Table 11.2 of the SEA Environmental Report and Table 6.1 of the Natura Impact Report)
- Site specific mitigation measures Tables 2.3 and Tables 4.2 to 4.22 (As outlined in Table 11.3 of the SEA Environmental Report and Tables 3.21- 3.41 of the Natura Impact Report)
- Mitigation measures per theme Tables 3.2-3.8 for which this project will crosscut a number of the themes as relevant.

In addressing these mitigation measures and utilising the tiering of environmental assessment[1] particular attention should be placed on the measures as identified in Table 4.3 specifically for Site C – Foynes Island. The site selection process for the marine investigations should be carefully considered in the context of achieving these mitigation measures and informing the subsequent assessment process associated with these measures. For example, ensuring sufficient temporal and spatial sites are selected within the intertidal areas to inform any subsequent nett loss of this habitat in the context of site integrity associated with the SAC but also the SPA in terms of biomass loss.

In addition, as part of the foreshore licence application SFPC should be cognisant of other applications for site investigations within the Shannon Estuary in terms of the assessment associated with cumulative and in-combination effects as there may be cross over in terms of acoustics which can have a negative impact on a number of the Qualifying Interest Features of the SAC, most notably Bottlenose Dolphin (*Tursiops truncates*).

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[1] EPA Research 2030 Reports | Environmental Protection Agency

Clare County Council welcomes the site investigations at Foynes Island and would ask that this submission be considered as part of the preparation of the final programme of surveys and look forward to furthering engagement in the process together with the subsequent foreshore licence application.

Mise le meas,

Garreth Ruane
Senior Executive Planner
Planning & Economic Development

Appendix C– Annex IV Species Risk Assessment of Marine Site Investigations at Foynes Island Co. Limerick

ANNEX IV SPECIES RISK ASSESSMENT OF MARINE SITE INVESTIGATIONS AT FOYNES ISLAND, CO LIMERICK

Prepared by Dr Simon Berrow

IWDG Consulting, Merchants Quay, Kilrush, Co Clare

1 | INTRODUCTION

The Irish Whale and Dolphin Group (IWDG) was contracted by RPS to carry out an Annex IV Species Risk Assessment of the proposed site investigations in association with the proposed new deep water terminal at Foynes Island (Figure 1). Annex IV species include cetaceans, marine turtle, otter and bats. Although not listed on Annex IV, we have included pinnipeds (seals) in this assessment as they frequently occur in waters adjacent to Foynes Island.

Figure 1: Location of Foynes Port and Foynes Island within the Shannon Estuary

1.1 | Proposed works

The Shannon Foynes Port Company (SFPC) has identified a number of key growth sectors for the port involving new berthing facilities, onshore infrastructure and the ability to accommodate larger vessels, to serve wider markets in an efficient and competitive manner. The development of a new Deepwater terminal adjacent to Foynes Port is currently under consideration. SFPC has recently concluded a feasibility study on the potential design options for a new deep water terminal at Foynes Island.

The proposed activity/works involve a **Marine Site Investigation** to support the planning and engineering design of the Foynes Island Deep Water Berth Development on Foynes Island. It is intended to perform both geophysical and geotechnical marine-based site investigation to inform the design of the proposed bridge crossing over to the South-East corner of Foynes Island from Foynes Port, construction of an access road across the island, construction of quay/marine infrastructure with associated quay furniture/services and development of a hardstanding hinterland area at the North-West edge of the Island. The surveys will entail the following activities:

- Standard methods of non-invasive acoustic based sensing will include the gathering of bathymetric, side scan sonar, sub-bottom profiler and magnetometer data.
- Standard methods of geotechnical investigation including deep boreholes (30-45m deep), shallow boreholes (5-10m deep). The boreholes are to be drilled firstly using cable percussive techniques. If rock is to be penetrated, then rotary drilling will follow on. For each borehole the footprint of the works on the foreshore will be four approximately 1 m^2 legs of the jack-up barge and the 200mm (8") temporary steel casing. The 200mm steel casing is the diameter of the borehole.
- Operation and manoeuvring of typical jack-up barge, survey vessels and floating pontoon equipment.

The borehole works will be carried out during two separate phases, pre-planning (phase 1 in Q1-Q2 2024) and post-planning (phase 2 in 2026). There will be a total of 79 boreholes in phase 1 and 84 boreholes in phase 2. The geophysical surveys will be undertaken in phase 1 (pre-planning).

1.2 | Environment

The location of the proposed site is within an area designated as Natural Heritage Area as well as being part of the River Shannon and Fergus Estuary SPA, and the Lower Shannon SAC. The receiving environment includes the benthos, the benthic, demersal and pelagic fish in the area, and the species listed on Annex IV including cetaceans, marine turtles, otter and bats. This report considers the risk to Annex IV species from the proposed site investigations with the addition of seals which are protected under the Wildlife Act and listed on Annex II of the EU Habitats Directive.

2 | METHODS

This risk assessment was based on original data collected by the IWDG in the Shannon Estuary since 1993 and a review of the available literature. Marine mammals and turtles are highly mobile and the potential for this development to impact on adjacent sites and important habitats at some distances from the development have been assessed.

Figure 2: Proposed Site Investigations around Foynes Island, Co Limerick (geophysical surveys to occur within the red line boundary)

3 | LEGAL STATUS

Irish cetaceans (whales, dolphins and porpoises), pinnipeds, otter and Leatherback Turtle are all protected under national legislation and under a number of international directives and agreements which Ireland is signatory to. All cetaceans, as well as grey and harbour seals, are protected under the Wildlife Act (1976) and amendments (2000, 2005, 2010 and 2012). Under the act and its amendments it is an offence to hunt, injure or wilfully interfere with, disturb or destroy the resting or breeding place of a protected species (except under license or permit). The act applies out to the 12 nautical mile limit (nml) of Irish territorial waters.

All cetaceans, otter and Leatherback Turtle are protected under Annex IV of the EC Habitats Directive (92/43/EEC). The Directive lists Annex IV species of community interest 'in need of strict protection'. Pinnipeds are not listed on Annex IV but are listed on Annex II, which also includes the harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), leatherback turtle (*Dermochelys coriacea*) and otter (*Lutra lutra*) which are of community interest and whose conservation requires the designation of special areas of conservation. The proposed development is wholly within the Lower River Shannon SAC which includes bottlenose dolphin and otter as qualifying interests.

Ireland is also signatory to conservation agreements such as the Bonn Convention on Migratory Species (1983), the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992) and the Berne Convention on Conservation of European Wildlife and Natural Habitats (1979).

Under the EU Marine Strategy Framework Directive with respect to maintaining good environmental status (GES), "*human activities should occur at levels that do not adversely affect the harbour porpoise community at the site*" and "*proposed activities or operations should not introduce man-made energy at levels that could result in a significant negative impact on individuals and/or the community of harbour porpoise within the site*". This refers to the "*aquatic habitats used by the species in addition to important natural behaviours during the species annual cycle*".

In 2007, the National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht produced a '*Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters* (NPWS, 2007). These were subsequently reviewed and amended to produce '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters*' (NPWS 2014). The guidelines recommend that listed coastal and marine activities be subject to a risk assessment for anthropogenic sound-related impacts on relevant protected marine mammal species to address any area-specific sensitivities, both in timing and spatial extent, and to inform the consenting process.

Once the listed activity has been subject to a risk assessment, the regulator may decide to refuse consent, to grant consent with no requirement for mitigation, or to grant consent subject to specified mitigation measures.

The Shannon dolphin population exhibits population structure which can be crudely described as comprised of "inner" and "outer" estuary dolphins. All individuals who have been sighted in the inner estuary have also been sighted in the outer estuary, suggesting the population mixes in this area. But many of the "outer" estuary dolphins have not been recorded in the inner estuary (Baker et al. 2018). Around 25% of the known population use the inner estuary all the time which has strong management implications as the degree of exposure to anthropogenic threats would be different for individuals of the inner and outer areas.

4 | BASELINE ENVIRONMENT

4.1 | Ambient Noise Levels

Ambient, or background noise, is defined as any sound other than the sound being monitored (primary sound) and, in the marine environment, is a combination of naturally occurring biological and physical sound sources including sediment transfer, waves and rain and that of a biological origin including fish, crustaceans and from marine mammals. The impact of noise created by human activity is strongly influenced by background or ambient noise, the impact is less in a noisy environment compared to a quiet environment and it's the intensity and frequency of this increased noise compared to the ambient levels at a site, which defines its impact. As ambient noise levels increase, the ability to detect a biologically important sound decreases. The point at which a sound is no longer detectable over ambient noise is known as acoustic masking. The range at which an animal is able to detect these signals reduces with increasing levels of ambient noise (Richardson *et al.* 1995). This is important when considering the impact of sound sources on marine mammals by the proposed works.

Ambient noise in the Shannon Estuary was measured by Beck et al. (2013) at two locations (Labasheeda Bay and Kilbaha Bay, County Clare) and reported a mean±SD noise levels in dB re 1 µPa of 100±7.5 which was 3 db lower than Galway Bay and 13 db lower than Dublin Bay. In the Shannon Estuary there were a limited number of shipping transits resulting in a lower variation while the level of large ships in the area maintained a constant shipping noise level.

4.2 | Marine Mammals

This risk assessment was based on original data collected by the IWDG and a review of the available literature. The IWDG have been working in the Shannon Estuary since 1993 (Berrow et al. 1997) and have a unique understanding of the use of the estuary by marine mammals. Most surveys have been carried out in the outer and mid estuary west of Tarbert, Co. Kerry but acoustic monitoring and recent boat-based surveys throughout the year of the inner estuary has improved our knowledge of the use of the inner estuary by dolphins and other marine mammals.

Reynolds (2020) published a list of mammal species recorded on Foynes Island since 1991. This included otter, long-eared bat and bottlenose dolphin. A number of marine mammal species have been recorded in the Shannon Estuary including grey and common seals and bottlenose dolphin. Although not strictly a marine mammal, otter also occur along the shores of the estuary and forage within the estuary. The Lower River Shannon SAC includes bottlenose dolphins and otter as qualifying interests.

4.2.1 Cetaceans

Bottlenose dolphin (Tursiops truncatus)

The Shannon Estuary is one of the most extensively study sites for bottlenose dolphins in Europe. Bottlenose dolphins are found throughout the estuary but regular concentrations occur off Kilcredaun Head in the outer estuary and Tarbert-Killimer which is associated with foraging behaviour. Most research and monitoring work has been carried out in the outer estuary as far upriver as Tarbert-Killimer with relatively less up river of Tarbert.

The Shannon dolphin population exhibits population structure which can be crudely described as comprised of "inner" and "outer" estuary dolphins. All individuals who have been sighted in the inner estuary have also been sighted in the outer estuary, suggesting the population mixes in this area. But many of the "outer" estuary dolphins have not been recorded in the inner estuary (Baker et al. 2018). Around 25% of the known population use the inner estuary all the time which has strong management implications as the degree of exposure to anthropogenic threats would be different for individuals of the inner and outer areas. Foynes Port is situated in the middle to inner part of the estuary, which despite less survey effort research has shown is still used extensively by bottlenose dolphins including during winter. Reynolds (2020) reported a sighting off Foynes in April 1931 showing dolphins have been present at the site for many decades.

<u>Abundance estimates</u>

The first robust abundance estimate of dolphins using mark-recapture modelling of photo-id data was carried out in 1997 by Ingram (2000). At least two surveys were carried out each month between April and September and one per month during winter (weather permitting). During 45 photo-identification boat surveys Ingram (2000) identified 53 individual dolphins with well-marked dorsal fins. This resulted in an estimate of 113±16 dolphins with a CV of 0.14 and 95% Confidence Intervals of 94-161 individuals.

Since this first study a number of abundance estimates have been carried out using mark-recapture modelling of photo-id data. These estimates ranged from a peak of 140±12 in 2006 to a minimum of 107±12 in 2010 but were quite consistent over the period 1997-2018 (Ingram 2000; Ingram and Rogan 2003; Englund et al. 2007; 2008; Berrow et al., 2010; Rogan et al. 2015: 2018). During an extensive period of photo-id in the Shannon Estuary between 2012 and 2015 (Baker et al. 2018), a discovery curve of individuals identified against the cumulative number of identifications reached a clear plateau suggesting all individuals present in the estuary were captured.

No new adults or juveniles were recorded during the 2015 field season (excluding additions of new born calves to the population) resulting in an estimated extant population of 145 individuals comprising 80 adults, 25 juveniles and 40 calves (Baker et al. 2018). Excluding dependent calves, 121 individuals were sighted, of whom 98% (n = 119) were sighted in multiple years (Baker et al. 2018). Concurrent with this four year study, in 2015 Rogan et al. (2015) estimated an abundance of 114±14 with 95% Confidence Intervals of 90-143, which fitted within the estimate by Baker et al. (2018). The most recent estimate was carried out between June and September 2022 by Berrow et al. (2022) who provided a final best estimate of 116 ± 9 with a CV 0.08 and 95% Confidence Intervals of 103 to 122.

As part of a population viability study, Blásquez et al. (2021) found a number of false positives in Rogan et al. (2015) dataset and provided a revised estimate of 93 ± 8.81 with a CV of 0.09 and 95% Confidence Intervals of 83-103, which would be the lowest abundance estimate published to date. A mark-recapture analysis was also carried out by Blásquez et al. (2021) on the IWDG photo-identification catalogue during the same time period, and an estimate of 136 ± 18.0, with a CV of 0.13 Confidence Intervals of 125-202 was calculated. Interestingly, the most recent abundance estimate from the Shannon Estuary in 2018 (Rogan et al. 2018) produced a very similar abundance (139 ± 15.23; CV = 0.11; 95% CI = 121 to 160) to that calculated using the IWDG photo-identification catalogue in 2015 (Blásquez et al. 2021). Since the first mark-recapture estimate in 1997, estimates have been largely consistent, suggesting the population is stable. However, a population viability analysis which was carried out on the latest data from the Shannon Estuary suggested that the dolphin population is vulnerable to even small increases in adult mortality, or a reduction in reproduction rates (Blásquez et al. 2021).

Static Acoustic Monitoring

Static Acoustic Monitoring (SAM) using C-PODs has been used off Foynes Island and once within the harbour to assess the use of the area by bottlenose dolphins (Table 1). CPODs were deployed off Foynes Island for a total of 1428 days between February 2009 and November 2014. Dolphin clicks were logged on 549 different days or 38.45 of days monitored (Carmen et al. 2021). A high proportion of clicks (64%) were detected at night but diel tidal and lunar cycles all had significant effects on detection rates. Autumn had the highest predicted foraging using stepwise models but tidal cycle and tidal phase were found to be significant factors influencing foraging at the site. The differences in predicted foraging between ebb, flood, slack high and slack low were rather small, with flood tides having the lowest foraging and spring tides predicting significantly higher foraging than neap tides and transitional phases. Finally, evenings have the highest significant odds of detecting foraging trains, followed by nights.

A total of 176 days were monitored at Foynes Jetty for bottlenose dolphins between 23 February and 25 October 2010. Over the monitoring period dolphins were detected on from 27 to 47% of days (mean = 34% of days). A total of 162 DPM were recorded with a mean on 0.87 DPM per day (Table 1). When recorded, there was only one encounter per day and the duration of encounters were short with only 6 (3.4%) greater than 4 minutes (Figure 3). When detected, there was only one encounter per day and the duration of encounters were very short with 76% of detections were at night. This suggests that dolphins are using Foynes more frequently at night, maybe as there is less human activity and thus are rarely observed.

Table 1: Comparison of results from relevant SAM studies in the Shannon Estuary

Period	Duration (days)	% of days with detections	Detection Positive Minutes	Mean DPM/day (dolphin)	Reference
Foynes Island Feb 2009 – Oct 2010 Nov 2011 - Nov 2012 Apr-Aug 2018 2009-2014	591 288 140 1,428	41 47 34 39	1,227 1266 114	- 4.4 0.8	O'Brien et al. (2013) O'Brien and Berrow (2012) O'Brien and Berrow (2017) Carmen et al. (2021)
Foynes Harbour Feb – Oct 2010	176	34	162	0.87	Berrow and O'Brien (2011)
Canon Island Apr-Aug 2018	140	4	9	0.06	O'Brien and Berrow (2018)

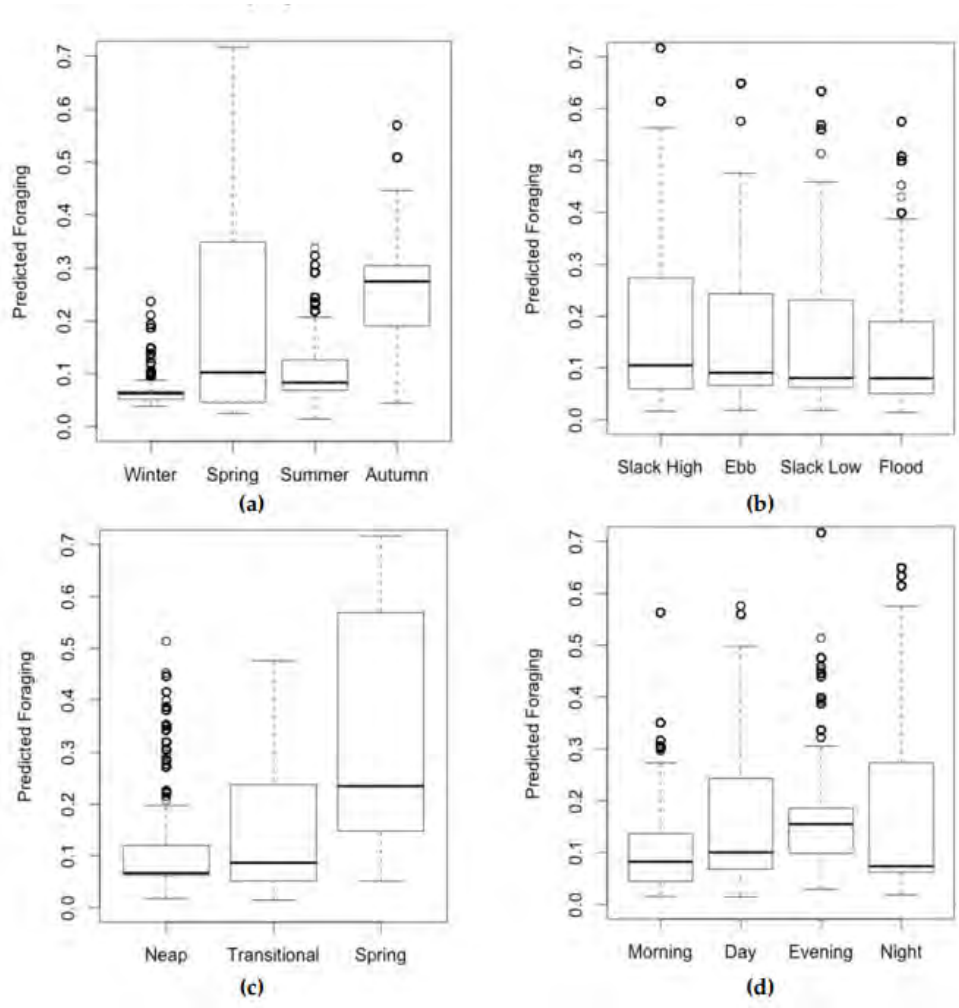

Figure 3: Predicted foraging at Foynes for the explanatory variables included in the best model: (a) Season; (b) Tidal Cycle; (c) Tidal Phase and (d) Diel Phase (from Carmen et al. (2021))

Harbour porpoise (Phocoena phocoena)

Harbour porpoise are the most widespread and abundant cetacean in inshore Irish waters, with highest abundances in the Irish Sea (Berrow *et al.* 2010). They are regularly reported at the mouth of the Shannon Estuary and occasionally within the outer estuary.

Recently O'Callaghan et al. (2021) reported on two sightings east of Scattery Island in the mid-estuary (Figure 4). These sightings are very unusual but this does demonstrate that they can on occasion venture up the estuary. There are no reports of sightings of harbour porpoise around Foynes Island but a porpoise stranded in moderate condition was reported on 9 August 2017 near the Foynes Yacht Club (O'Connell and Berrow, 2019).

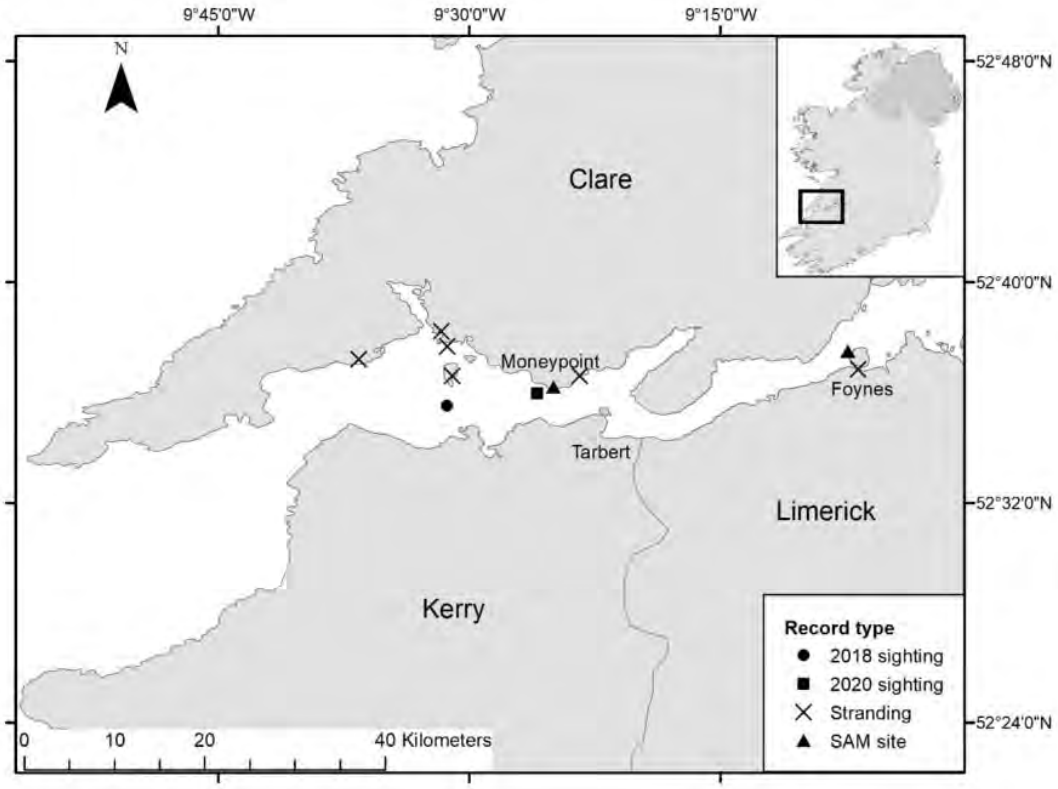

Figure 4: The location of Harbour Porpoise sightings, strandings and acoustic detections within the Inner Shannon Estuary from 1989-2020 (from O'Callaghan et al. 2021)

Common dolphin (Dephinus delphis)

Common dolphins are frequently recorded off the western seaboard of Ireland with peak counts during summer (Wall et al. 2013), including off Loop and Kerry Heads. Historically, they are rarely encountered in the Shannon Estuary but recently we have recorded common dolphins during the winter as far upriver as Tarbert. There is one stranding of a common dolphin on Saints Island in the mouth of the Fergus Estuary, east of Foynes Island but the carcass may have been brought in by the tide (**Figure 5**). The recent occurrence of common dolphins may be an artifact of increased survey effort during winter or part of a new trend.

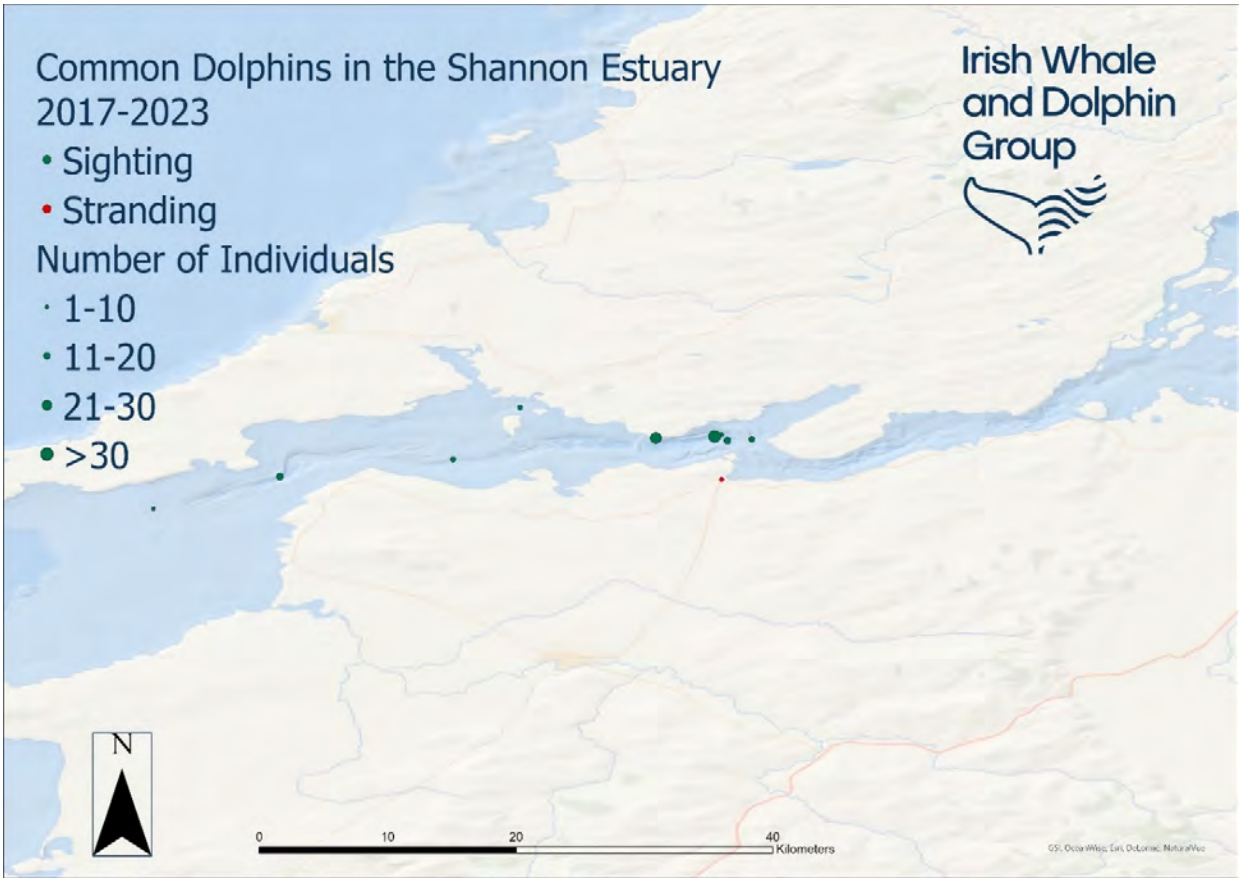

Figure 5: Location of recent common dolphin sightings within the Inner Shannon Estuary

4.3 | Other Annex IV species

Other Annex IV species of interest include marine turtles and bats. Data from the National Biodiversity Data Centre was also accessed (on 1 March 2023) to help inform this Annex IV assessment.

Five species of marine turtle have been recorded in Irish waters (King and Berrow 2009; Botterell *et al*. 2020) including: Leatherback (or Leathery) turtle (*Dermochelys coriacea)*, loggerhead (*Caretta caret*ta), Kemps Ridley (*Lepidochelys kempii*), Hawksbill (*Eretmochelys imbricata*) and green turtle (*Chelonia mydas*). Hawksbill and Green are very rare. Records of hard-shell turtles stranded in the UK, including loggerhead turtles and Kemp's Ridley turtles, have significantly increased over the last 100 years but with a notable decrease in records in the most recent years. The majority of records of hard-shell turtles were juveniles and occurred in the boreal winter months when the waters are coolest in the North-east Atlantic. In contrast to hard-shell turtles, leatherback turtles were most commonly recorded in the boreal summer months with the majority of strandings being adult sized, of which there has been a recent decrease in annual records (Botterell et al. 2020). All five species of marine turtles reported in Ireland are listed on Annex IV of the EU Habitats Directive.

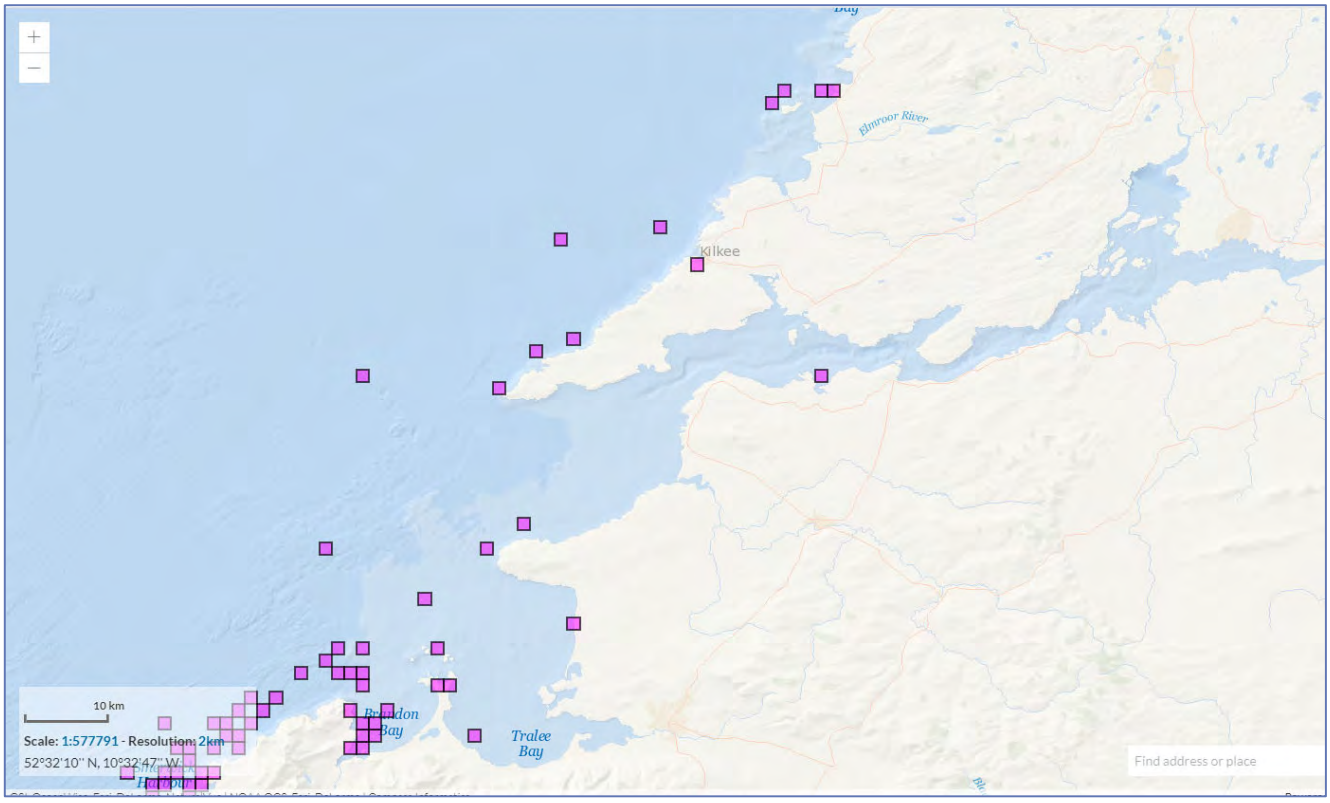

Figure 6: Map of leatherback turtle sighting records around the Shannon Estuary (map courtesy of the National Biodiversity Data Centre)

4.3.1 Leatherback turtle (Dermochelys coriacea)

Leatherback turtles are the largest extant sea turtle and have many unique anatomical and physiological adaptations (Doyle 2007). Leatherback turtles are reported regularly off north Kerry but there has been only one record within the Shannon Estuary (Figure 6), a historic record from July 1970 of indeterminate location (King and Berrow 2009).

4.3.2 Loggerhead turtle

Loggerhead turtles are stranded regularly in Ireland with records reported once every few years (King and Berrow, 2009; Doyle 2007; Marine Environmental Monitoring annual reports). They are very rarely sighted alive in Irish waters. A loggerhead turtle was recorded on 28 November 1998 stranded alive at Kilbaha, on Loop Head and taken for rehabilitation at Lahinch SeaWorld.

4.3.3 Kemp's Ridley turtle

Kemp's Ridley turtle are very rare in Irish waters with only 10 records on the NBDC database. However, one record was of a Kemp's Ridley turtle live stranded at Ballybunnion, Co. Kerry on 17 October 1992 and flown to the US for rehabilitation.

4.3.4 Otter (Lutra lutra)

Otters are widespread around the Irish coast and in the Shannon Estuary (Reid *et al.* 2013). Reynolds (2020) reported otter spraints as regularly recorded at the southern headland on Foynes Island at Bareen and are likely to occur all around the island but which is difficult to access from land to survey.

An otter survey of Foynes Port was carried out on 26 April and 3 June 2010 as part of the Foynes land Reclamation project (Berrow and O'Brien 2011), but no signs of otter presence were recorded. The lands at Durnish Island were surveyed again in August 2016 and at the East Jetty in July 2017 as part of the SFPC Capacity Extension Project. No signs of otter presence but they are considered likely to use the sites particularly the north of the Durnish lands. Records of otters from Foynes and adjacent mainland are presented below (Figure 7) and are likely to be present in most 10km^2 in the immediate area.

Figure 7: Map of otter records around Foynes (map courtesy of the National Biodiversity Data Centre)

4.3.5 Bats

All bat species in Ireland are protected under the EU Habitats Directive (92/43/EEC) and listed in Annex IV of this Directive. This Annex IV Species Risk Assessment has also considered the potential for any impacts from the proposed activities at the site on any of the ten species of bat that are confirmed as resident in Ireland (Kelleher and Marnell, 2006).

Reynolds (2020) reported bats were seen regularly at dusk but was not aware of any roosts on the island. With the exception of a sighting of a long-eared bat (*Plecotus auritus*) near the house on the east side of Foynes Island no other species has been confirmed present. The only bat records recorded adjacent to the site was the Sopano

pipistrelle bat (*Pipistrellus pygmaeus*) according to data supplied by the National Biodiversity Data Centre (accessed 1 March 2023) (Figure 8).

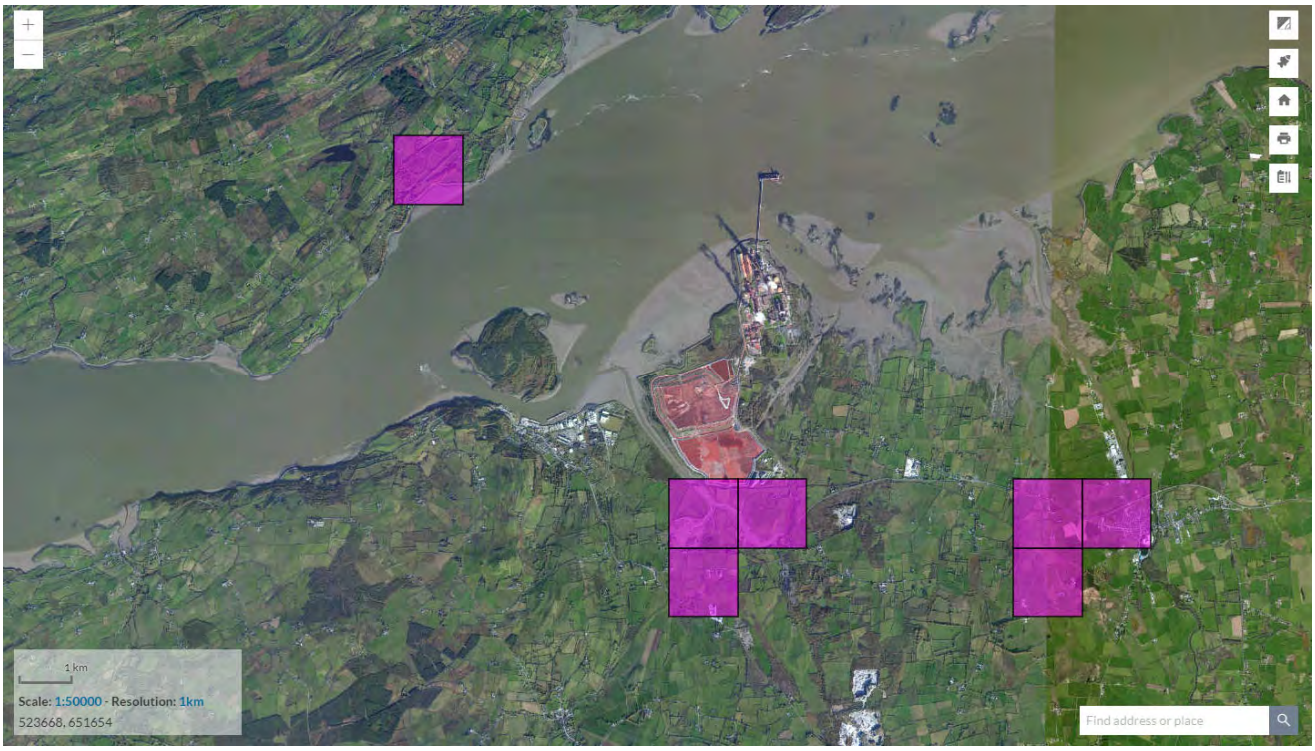

Figure 8: Map of soprano Pipistrelle bat distribution around Foynes Harbour (map courtesy of the National Biodiversity Data Centre)

4.4 | Non -Annex IV species but of conservation interest (ETP)

4.4.1 Basking shark (Cetorhinus maximus)

Basking sharks are frequently observed off the west coast of Clare and Kerry. Basking sharks are seasonally abundant on the surface during early spring and summer but may occur in continental shelf Irish waters throughout the year. There are no records of basking sharks in the Shannon Estuary (IWDG *unpubl. data*).

4.4.2 Pinnipeds

Grey and harbour seals are distributed around the entire Irish coast with grey seals being more abundant along the western seaboard (Cronin *et al.* 2004; O'Cadhla *et al.* 2007; O'Cadhla and Strong 2007). Common and Grey seals are occasionally reported hauled out east of Foynes Island on Sturamis Island and Beeves Rock upriver of Foynes Port. Although both species only occur in small numbers these seals are part of a much wider population.

5 | IMPACT ASSESSMENT

5.1 | Introduction

Site investigations will primarily lead to increased noise in the local marine environment. Noise associated with geophysical surveys will occur for 2 weeks and planned for Q2/2024. Noise associated with borehole investigations will be more prolonged and take 18 weeks in phase 1 in Q1-Q2/2024 and 16 weeks in phase 2 in (Q1 2026). Although this period is long drilling will not be continuous with periods of no noise production between drilling. Excess noise produced during drilling should attenuate quickly and only ensonify the local area in Foynes Harbour within Foynes Island. Surveys and drilling on the estuary side of Foynes Island will ensonify the estuary and could impact on bottlenose dolphins transiting the site. Disturbance may also occur due to increased vessel traffic associated with the site investigations.

The surveys will entail the following activities:

- Standard methods of non-invasive acoustic based sensing will include the gathering of bathymetric, side scan sonar, sub-bottom profiler and magnetometer data.
- Standard methods of geotechnical investigation including deep boreholes (30-45m deep), shallow boreholes (5-10m deep).
- There will be 79 boreholes in pre-planning (phase 1) and 84 boreholes in post planning (phase 2).
- Operation and manoeuvring of typical jack-up barge, survey vessels and floating pontoon equipment.

Figure 9: Proposed Site Investigations around Foynes Island, Co Limerick

Potential impacts on Annex IV species include localised disturbance, habitat degradation (e.g. decline in availability of potential prey), impulsive sound due to geophysical site investigations and continuous due to drilling and increased ambient noise due to increased vessel traffic. The marine section of the receiving environment is largely restricted to the northwest part of Foynes Island and a limited area across the island. Impacts in the wider estuary include the channel between Foynes and Cahiracon to the north and adjacent waters east and west depending on sound attenuation.

The potential effects of the proposed site investigations on Annex IV species was addressed by assessing the likelihood that these species would be exposed, or interact, with marine activities. Impacts assessed include likelihood of occurrence, and disturbance especially from noise emitted during site investigations and from extra marine activity. Acoustic disturbance includes the ability of the individual to detect increased noise levels over ambient levels, masking, Temporary Threshold Shift (TTS) and Permanente Threshold Shift (PTS) and behavioural impacts, i.e. resulting in a behavioural change by individuals.

5.2 | Description of Activities

5.2.1 Geophysical Surveys

Geophysical acoustic surveys in marine or coastal waters involve the systematic collection of information on the physical environment by means of sound signal production, reception, analysis and interpretation. Such techniques may be used, for example, to investigate bathymetry, to analyse the structure and composition of the seabed substrate, to explore extensively for and investigate subsurface geological structures or to survey specific targets (e.g., hydrocarbon reservoirs, wrecks, oceanographic features). Such methods commonly involve the use of ships or smaller vessels fitted with specialised equipment or from which such equipment can be deployed or towed. The level of environmental impact associated with this acoustic activity is variable depending on a number of factors including the type of the equipment being used, its sound signal and propagation characteristics, and the depth in which it is operating (NPWS 2014).

Geophysical surveys in coastal waters are commonly mobile, taking the form of a systematic series of survey lines within an overall target area. Depending on the location and scale of this area and the data objectives such acoustic surveys may require a period of hours, days or weeks, with many surveys being performed on a 24-hour basis once they have begun. These activities, particularly where accurate geophysical data are required via a deep acoustic penetration into the seafloor, in substantial water depths or at high resolutions, have the potential in many circumstances to introduce persistent pulse and/or non-pulse sound at levels that may impact upon marine mammal individuals and/or populations, constituting an important conservation risk (NPWS 2014).

Geophysical and geotechnical equipment produce a wide range of frequencies and source levels. MacGillivray *et al.* (2014) used modelling to explore the acoustic effects of marine survey sound sources on marine mammals. They reviewed the acoustic signatures of widely used equipment (see Table 2, reproduced from MacGillivray et al. (2014)). Sub-bottom profilers produced frequencies of 1-6 kHz at a source level of 200 dB re 1µPa @1m, while multibeam and side-scan sonar much higher frequencies of 200-230kHz at 218-229 dB re 1µPa @1m. The model indicated that odontocetes were most likely to hear sounds from mid-frequency sources (fishery, communication, and hydrographic systems), mysticetes from low-frequency sources (sub-bottom profiler and airguns), and pinnipeds from both mid- and low-frequency sources. High-frequency sources (side-scan and multibeam) generated the lowest estimated sensation levels for all marine mammal species groups.

Table 2: Selected Geophysical survey sources and their modelled specifications (reproduced from MacGillivray et al. (2014))

Table 1. Selected geophysical survey sources and their modeled specifications.

Type	Model	Frequency (kHz)	Beam width (−3 dB)	Beam orientation	Source level (rms dB re 1 μPa @ 1 m)	Rep. rate (/sec)	Pulse length (ms)
		Low-frequency (<10 kHz)					
Airgun array	Bolt 4×40 in^3	0.005-2 (pulse)	n/a	n/a	229[b]	0.1	100
Sub-bottom profiler	EdgeTech DW-106	1–6 (chirp)	28°–36° circular	vertical	200	15	33
		Mid-frequency (10 to 100 kHz)					
Communications transceiver	Simrad HiPAP 500 USBL	23	10° circular	2° from horizontal[a]	206	1	1000
Fish finding sonar	Simrad SX90	26	7° circular	2° from horizontal[a]	215	1	72
Hydrographic echosounder	Simrad EA500	38	7° circular	vertical	232	0.5	0.1
		High-frequency (>100 kHz)					
Multibeam echosounder	Simrad EM2000	200	150° × 1.5° rectangular	vertical	218	10	0.2
Side-scan sonar	EdgeTech 4500DF	230	50° × 0.15° rectangular	30° from horizontal	229	10	20

[a]Sonars with steerable beams were oriented toward the horizontal.
[b]Maximum source level in horizontal plane.

Side scan sonar, sub-bottom profiler and Magnetometer

Sub-bottom profilers are typically low to mid-frequency with high source levels and could impact on marine mammals (Table 3). Typical level magnitudes of Sub-Bottom Profilers used by IFREMER (2016) showed transmitted signals were quite homogeneous between constructors (Ixblue, Kongsberg, Knudsen). The peak levels of acoustic pressure were in the range 213 to 228 dB re 1µPa @1m. The FM signal features a long modulation typically of a few tens of ms with a relatively constant level in the frequency band. The typical pulse length was 80 ms, and the usable frequency band was between 1.8 and 5.3 kHz. The SPL (Sound Pressure Level) received is equal to 213 dB re 1µPa@1m with a pulse length of 80 ms, is 202 dB re 1 µPa².s @ 1m (IFREMER 2016).

Acoustic sources are prone to impact marine mammals when the values of SPL and SEL received by the marine mammals are above specific tolerance thresholds (depending on the signal type and frequency, and on marine mammal species). Southall et al. (2007) recommend a threshold of 215-230 dB re. 1µPa²×s. The results suggest that auditory damage is only likely if animals pass the transducer at close range and that the impact on marine mammals can be mitigated by implementing prior detection and shut down procedures.

Table 3: Typical sound characteristics of a range of sub-bottom profilers

(from https://www.federalregister.gov/documents/2015/06/30/2015-16012)

Model	High Frequency	Parametric or low Frequency	Source level primary	Source level parametric	
Atlas Parasound	18-33 kHz	0.5 to 6kHz	242/245dB	206/200 dB	Whale warning mode
Kongsberg SBP 120		2.5 to 7 kHz	220 dB		
Innomar SES-2000 Deep Parametric sub-bottom profilers	35 kHz	2, 3, 4, 5, 6, 7 kHz	244 dB		
Huntec boomer		0.5 to 8 kHz	205 dB		
Edgetech 512i		1 to 12 kHz	198 dB		
SIG '2 mille' mini-sparker		1 to 6 kHz	204 dB		
Arena Sub K-Chirp 3310		2 to 8 KHz	204 dB		
Applied Acoustics AA201 and AA301 boomer		1 to 6 kHz	212/215 dB		
Applied Acoustics Squid 500/2000 sparker		1 to 3.5 kHz	216/222 dB		
Applied Acoustics S-Boom		1 to 5 kHz	222dB approx.		

5.2.2 Boreholes

Both deep boreholes (30-45m deep) and shallow boreholes (5-10m deep) will be carried out. There will be 79 boreholes in phase 1 and 84 boreholes in phase 2. For each borehole the footprint of the works on the foreshore will be four approximately 1 m^2 legs of the jack-up barge and the 200mm (8") temporary steel casing. The 200mm steel casing is the diameter of the borehole. The boreholes are to be drilled firstly using cable percussive techniques. If rock is to be penetrated, then rotary drilling will follow on.

Borehole drilling is typically a source of low-frequency continuous noise at relatively low sound pressure levels (SPL). Recent measurements of geotechnical drilling in shallow waters (Huang Long-Fei et al. 2023) recorded an SPL of 155.9 dB re 1µPa rms @ 1 m at a peak frequency of 45 Hz. Sound measurements from a jack-up drilling boreholes in Australia showed a range of 142–145 dB re 1 µPa rms @ 1 m between 30 – 2000 Hz (Erbe &

McPherson 2017). Evans (1996 cited in Evans 2003) found SPLs of 59-127 dB re 1µPa rms @ 1 m at a peak frequency of 16Hz. Mitigation for drilling is provided for in the NPWS (2014) guidelines.

5.2.3 Increased vessel traffic

Increased vessel traffic during the site investigations is restricted to survey craft deployed during the geophysical surveys and a jack-up barge the site and will be an insignificant increase over existing vessel traffic. The presence of small vessels in the area may lead to a very localised increase in vessel traffic and associated noise. The presence of an additional small vessel and the associated noise produced, is very unlikely to have a significant impact on Annex IV species. As the likelihood of most Annex IV species, aside from bottlenose dolphin, being in the vicinity of the construction site is low there is an low risk of excessive sound exposure and impact.

5.3 | Impact Assessment

Although there are few empirical studies on the effects of geophysical and geotechnical techniques on pinnipeds or odontocetes (Richardson *et al.* 1995). Elevated noise from sub-bottom profilers could affect seals which are sensitive to a lower frequency ranges than odontocetes (Todd *et al.* 2015).

5.3.1 Bottlenose dolphins

MacGillivray et al. (2014) showed that low-frequency sources such as sub-bottom profilers were the most audible sources to large baleen whales. Mid-frequency sources (fisheries, communication, and hydrographic systems) were the most audible sources to odontocetes at ranges below 3km, but low-frequency sources began to dominate between 3 and 10 km. Low- and mid-frequency systems have similar estimated audibility for seals due to their broad hearing range. For all species, modelled sensation levels are lowest for the high-frequency sources (side-scan and multibeam), which operate at the upper limits of the audible spectrum. The estimated zone of audibility for all species is largest for the low-frequency sources (sub-bottom profiler), which propagate over longer distances relative to the rapidly attenuating high frequencies. Thus bottlenose dolphins if very close to the vessel during site investigations may lead to disturbance and at worse temporary threshold shift (TTS).

Mahon (2017) found an impact of drilling on land associated with erecting onshore wind turbines at Moneypoint, with an increase in whistles vocalisations during drilling, compared to when there was no drilling. What the implications of these findings are, and the impact on dolphins, is unclear but it does indicate an effect of drilling even when occurring on land adjacent to the estuary. Similar vibration and rotary drilling occurring in the actual marine environment will lead to increased noise levels compared to that recorded by Irwin-Carr (2021) and potentially to greater impacts.

5.3.2 Seals

Anderwald *et al.* (2013) found that grey seals showed some level of avoidance to high construction vessel traffic in Ireland but this study was in a relatively pristine environment. This exposure may lead to some chronic exposure to man-made noise, with which they tolerate. Ecological or physiological requirements may leave some marine mammals with no choice but to remain in these areas and continue to become chronically exposed to the effects of noise. In areas with repeated exposure, mammals may become habituated with a decline in avoidance responses and thus become less sensitive to noise and disturbance (Richardson *et al.* 1995). Reactions, when measured, have only occurred when received sound levels are well above ambient levels.

5.3.3 Otters

Otter are quite sensitive to low frequency sounds as their sensitivity range is low but they are less sensitive than marine mammals. They can therefore hear and are susceptible to the noise of shipping, geotechnical drilling, SBP and HESS. However only those individuals within the water will be exposed and then only when very close to the activities.

The presence of otters is assumed, but the proposed marine site investigations wouldn't have potential to give rise to any significant impacts to otter, as these areas are already subject to some levels of human disturbance and are part of much larger areas of suitable habitat for the species in the wider area, with coastal territories between 2km and 10km of shoreline. In addition otter are primarily nocturnal, although coastal otters certainly appear to be less so, and the works will take place during the day. The marine SI will have extremely limited potential to impact upon terrestrial resting and breeding locations for otter.

5.3.4 Bats

The area has low suitability for bats, due to the absence of preferred bat habitats (e.g., woodland, hedgerows, freshwater lakes and rivers) or roost sites. Considering the low suitability of the area for roosting, foraging or commuting bats, the site is considered to be of negligible value for bats. Based on these findings in relation to bats as it is concluded that the proposed works will have no impact on the terrestrial Annex IV species, bats.

5.3.5 Leatherback turtles

Leatherback turtles are unlikely to be disturbed by marine activities even if they were in the vicinity. However, the likelihood of marine turtles being in the area during operations is non-existent as the operations planned to occur in Q1 and Q2 2024.

5.4 | Identification of Relevant Natura 2000 sites with marine mammals as a qualifying interest

Marine mammals are highly mobile and range far outside those sites designated to protect them. Outside of the Lower River Shannon SAC, which has bottlenose dolphins as a qualifying interest and where the site investigations occur wholly within the site, the Blasket Islands SAC is the closest SAC where marine mammals are included as qualifying interests (Table 4).

Table 4: Special Areas of Conservation, which list marine mammals as a Qualifying Interest, within reasonable foraging range of Shannon Estuary

Site	Qualifying Interest			Distance to Foynes Island	
	Grey seal	Harbour seal	Harbour porpoise	nmls	km
Blasket Islands SAC (Site Code 002172)	X		x	67.5	125

The boundary of the Blasket Islands SAC is around 125km from Foynes Island, Although harbour porpoises are highly mobile and have been occasionally reported in the inner estuary (O'Callaghan et al. 2021), it is extremely unlikely they will be exposed to proposed works at Foynes Island and there will be no impact on the Conservation

Objectives of the Blasket Islands SAC. While grey seals have been reported in waters adjacent to Foynes Island and it is possible that these same individuals may breed in the Blasket Islands SAC, the mitigation proposed during potentially harmful activities will ensure any exposure will not lead to any impact and there will be no impact on the Conservation Objectives of the Blasket Islands SAC for grey seals.

5.4.1 Potential disturbance to life cycle

The proposed marine operations will not cause any adverse effects on Annex IV species in the area as the affected area is small and disturbance very local and of relatively short duration.

5.4.2 Cumulative Effects

Cumulative effects may occur if the proposed development time period overlaps with proposed site investigations or relevant activity downstream as noted in Table 5.

Table 5. Activities which may lead to Potential Cumulative Effects

Development	Location	Activities	Period	Distance from Foynes Island
Eirgrid Cross Shannon 400kV Electricity Cable	Moneypoint, Co Clare to Kilpaddoge, Co Kerry	Laying of 400 kV submarine cables across the Lower Shannon Estuary	2023/2024	19 km
Shannon Technology and Energy Park	Ardmore point. Co Kerry	Site investigations	None	22km
Atlantic Energy Hub	Moneypoint, Co Clare	Site investigations	None	22km
Clarus Offshore Wind Farm	Extends from Tarbert in the Lower Shannon Estuary to the Mouth of the Shannon and along the Co Clare Coastline to Doonbeg	Site investigations (subject to foreshore consent)	Programme 5 years post consent	17km
Illen Offshore Array	Extends from Kilpaddoge, Co Kerry in the Lower Shannon Estuary to the Mouth of the Shannon and seaward to the 12nm limit	Site investigations (subject to foreshore consent)	Programme 5 years post consent	19 km
Mainstream Renewable Power Ltd.	Extends from Tarbert in the Lower Shannon Estuary to the Mouth of the Shannon and northwards along the Co Clare Coastline to Doonbeg and southwards along the County Kerry Coastline to the south of Ballyheige Bay	Site investigations (subject to foreshore consent)	2023/2024 assuming foreshore consent	17km

Moneypoint Offshore Wind	Moneypoint Co Clare in the Lower Shannon Estuary through the Mouth of the Shannon and seaward to the 12nm limit	Site investigations (subject to foreshore consent)	None	22km
Rian Offshore Array Ltd.	Tarbert Co Kerry in the Lower Shannon Estuary through the Mouth of the Shannon and seaward to the 12nm limit	Site investigations (subject to foreshore consent)	None	17km

5.4.2 Conclusion

Mitigation for some Annex IV species will be required. The likelihood of bottlenose dolphin and to a lesser extent seals and otter occurring with the impact zone is high, especially during activity to the north of Foynes Island. It is likely any sound pressure from site investigations could impact on bottlenose dolphins and seals without mitigation. Although otters may occur in the area, risk exposure is extremely low as most noise will occur within the marine environment and activities will be carried out during the day. Mitigation is required to minimize impacts on these Annex IV species and the NPWS (2014) guidelines would apply during geophysical and geotechnical operations.

It is extremely unlikely that species such as marine turtles or basking sharks will be exposed to potential impacts as the likelihood of them being within the impacted area is extremely low. Although bats may occur in the area risk exposure is extremely low as most noise will occur within the marine environment and activities will be carried out during the day.

6 | MITIGATION MEASURES

Mitigation is required to minimize impact for some Annex IV species including bottlenose dolphin, seals and otter. We recommend implementation of the NPWS (2014) guidelines and limited static acoustic monitoring as outlined below.

6.1 | Marine Mammal Mitigation

The National Parks and Wildlife Service recommend a distance of 500m radial distance of the sound source in water depths of <200m (NPWS 2014) on commencement of drilling and 500m radial distance of the sound source with respect to geophysical surveys.

6.1.1 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters

The mitigation measures recommended by the NPWS are for the presence of a trained and experienced Marine Observer (MMO) to ensure a “buffer zone” is clear of marine mammals prior to the start of noise inducing activities. The proposed mitigation measures (Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters) recommended by the Department of Arts, Heritage and the Gaeltacht in 2014 are designed to mitigate any possible effects. The following mitigation measures are proposed to minimise the potential impacts on marine mammals and to allow animals move away from the area of geophysical and geotechnical operations:

1. A dedicated, qualified and experienced Marine Mammal Observer will conduct a 30-minute watch for marine mammals within 500m prior to start-up of drilling and 1000m for geophysical surveys (Figure 10). If an Annex IV species (cetacean, marine turtle or otter) or seal is sighted within 500/1000m of the site, start-up must be delayed until the animal(s) is observed to move outside the mitigation zone or the 30 minutes has passed without the animal being sighted within the mitigation zone.
2. Multibeam, single beam, side-scan sonar and sub-bottom profiler surveys activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.
3. Drilling activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.
4. Once normal operations commence, there is no requirement to halt or discontinue the activity at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500/1000m radial distance of the sound source, i.e., within the MZ.

10a.

10b. 

Figure 10: a) Proposed 500m mitigation zone around drilling and b) 1000m mitigation zone around geophysical and geotechnical activities proposed at Tarbert Island (as per NPWS (2014) guidelines)

6.1.2 Static Acoustic Monitoring

Static acoustic monitoring through the use of FPODs at Foynes jetty and a control site, will also be carried out prior to, and throughout site investigations, and for a period post surveys to ensure bottlenose dolphin activity at the site is not affected long-term and the presence of dolphins at the site returns to pre-site investigation levels.

7 | NPWS ASSESSMENT

1. **Do individuals or populations of Annex IV species occur within the proposed area?**
   Bottlenose dolphin are the most frequently recorded Annex IV species adjacent to the site. Otters, also occur at the site and bats forage within the site but marine turtles do not occur.

2. **Is the plan or project likely to result in death, injury or disturbance of individuals?**
   The activities proposed during site investigations are boring, side-scan sonar and sub-bottom profiler surveys. It is likely that noise generated will be capable of causing disturbance or temporary hearing injury to a marine mammal without mitigation.

   The project may cause injury and disturbance without the proposed mitigation, as impacts including noise associated with the project may travel a short distance potentially exposing a suite of Annex IV species to the activity. The risk of injury in the marine environment is considered high, but low for terrestrial Annex IV species.

3. **Is it possible to estimate the number of individuals of each species that are likely to be affected?**
   Abundance estimates for bottlenose dolphins within the Lower River Shannon SAC are available. The most recent estimate was carried out between June and September 2022 by Berrow et al. (2022) who provided a final best estimate of 116 ± 9 with a CV 0.08 and 95% Confidence Intervals of 103 to 122. However not all the Shannon dolphins use the inner estuary and is more likely a sub-set of 30-40 individuals may be exposed to site investigations. Seals occur in low numbers within the Shannon Estuary. Otters are also likely to occur in small numbers but there are no marine turtles.

4. **Will individuals be disturbed at a sensitive location or sensitive time during their life cycle?**
   The proposed geophysical works are scheduled to be carried out for 2 weeks during Q2/2024. Boring will take place over a 18 and 16 week period in Q1 and Q2/2024 and in Q1 2026. Bottlenose dolphins occur all year around with calving peaking late summer. Acoustic monitoring suggested autumn was the highest predicted foraging period at Foynes Island. Seals and otters also occur year round in small numbers.

5. **Are the impacts likely to focus on a particular section of the species' population, e.g., adults vs. juveniles, males vs. females?**
   Bottlenose dolphin calves may be exposed to site investigations if born towards the start of the summer. Immatures and dependant calves would also be exposed when occurring at Foynes Island.

6. **Will the plan or project cause displacement from key functional areas, e.g., for breeding, foraging, resting or migration?**
   The site, although regularly visited by bottlenose dolphins, is not a critical habitat. Acoustic evidence suggests that the proposed marine activities will not lead to any significant disturbance of Annex IV species known to occur in the area. Small numbers of grey seals may occur in the vicinity of the site but they are accustomed to human activities and are unlikely to be affected.

7. **How quickly is the affected population likely to recover once the plan or project has ceased?**
   Any disturbance occurring with the proposed mitigation in place would be short term and local to Foynes Island and not lead to any long terms impacts.

8 | RESIDUAL IMPACTS

There will be no residual impacts from the proposed marine operations on Annex IV species in the area.

9 | SUMMARY

Annex IV species do occur frequently in the area of interest, including the resident bottlenose dolphins, some seals and otters on the shore. No marine turtles occur at the site but bats will forage overhead. We recommend implementation of the NPWS (2014) mitigation guidelines which if implemented will result in no significant impacts on Annex IV species. Static Acoustic Monitoring for bottlenose dolphins before, during and after boring is also recommended to ensure mitigation results in no displacement of dolphins from the area.

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Appendix D – Supporting Information for Screening for Appropriate Assessment

SUPPORTING INFORMATION FOR SCREENING FOR APPROPRIATE ASSESSMENT

Foynes Island: Marine Site Investigations

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1 INTRODUCTION

With the introduction of the Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitat and of wild fauna and flora) came the obligation to establish the Natura 2000 network of Sites of Community Interest (SCIs), comprising a network of areas of highest biodiversity importance for rare and threatened habitats and species across the European Union (EU).

In Ireland, the Natura 2000 network of sites comprises Special Areas of Conservation (SACs, including candidate SACs) designated under domestic legislation transposing Directive 92/43/EEC, and Special Protection Areas (SPAs, including proposed SPAs) classified under the Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds) and designated under the same domestic legislation.

SACs are designated for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are designated for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is designated correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived.

SACs and SPAs make up the pan-European network of Natura 2000 sites. It should be noted that 'European sites' are defined in Regulation 2(1) of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended ('the 2011 Regulations').

1.1 Appropriate Assessment

1.1.1 The Habitats Directive

A key protection mechanism in the Habitats Directive is the requirement to subject plans and projects to Appropriate Assessment (AA) in line with the requirements of Article 6(3) of the Habitats Directive, which requires that–

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

Thus, Article 6(3) defines a step-wise procedure for considering plans and projects:

- The first part of this procedure consists of a preliminary 'screening' stage to determine whether, firstly, the plan or project is directly connected with or necessary to the management of the site, and secondly, whether it is likely to have a significant effect on the site; it is governed by the first sentence of Article 6(3).
- The second part of the procedure, governed by the second sentence of Article 6(3), relates to the appropriate assessment and the decision of the competent national authorities.

1.1.2 Domestic Transposition

1.1.2.1 Screening

Regulation 42 of the 2011 Regulations requires *inter alia* that screening for appropriate assessment of a project for which an application for consent is received, and which is not directly connected with or necessary to the management of the site as a European Site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that project, individually or in combination with other plans or projects is likely to have a significant effect on the European site.

A screening for appropriate assessment of an application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that proposed development, individually or in combination with another plan or project is likely to have a significant effect on a European site.

1.1.2.2 Appropriate Assessment

Regulation 42 of the 2011 Regulations requires *inter alia* that a public authority shall determine that an appropriate assessment of a project is required where the 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 that the project, individually or in combination with other plans or projects, will have a significant effect on a European site.

An appropriate assessment carried out by the competent authority shall include a determination under Article 6(3) of the Habitats Directive as to whether or not a proposed development would adversely affect the integrity of a European site and an appropria e assessment shall be carried out by the competent authority where it has made a determination under section 42(1) of the 2011 Regulations that an appropriate assessment is required, before consent is given for the proposed development.

1.1.3 The Appropriate Assessment Procedure

According to European Commission guidance documents 'Assessment of plans and projects in relation to Natura 2000 sites' (EC, 2021); 'Guidance document on wind energy developments and EU nature legislation' (EC, 2020); and 'Managing Natura 2000 sites: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC' (EC, 2019); the obligations arising under Article 6 establish a step-wise procedure as illustrated in Figure 1.1.

The first part of this procedure consists of a pre-assessment stage ('screening') to determine whether, firstly, a plan or project is directly connected with or necessary to the management of the site, and secondly, whether it is likely to have a significant effect on the site; it is governed by Article 6(3), first sentence.

The second part of the procedure, governed by Article 6(3), second sentence, relates to the appropriate assessment and the decision of the competent national authorities.

A third part of the procedure (governed by Article 6(4)) comes into play if, despite adverse effects on the integrity of the site concerned, it is proposed not to reject a plan or project but to give it further consideration. In this case Article 6(4) allows for derogations from Article 6(3) under certain conditions.

The extent to which the sequential steps of Article 6(3) applies to a given plan or project depends on several factors, and in the sequence of steps, each step is influenced by the previous step. The order in which the steps are followed is therefore essential for the correct application of Article 6(3).

Each step determines whether a further step in the process is required. If, for example, the conclusion at the end of a Habitats Directive stage one screening appraisal is that significant effects on European sites can be excluded in the absence of any best practice or targeted measures intended to avoid or reduce the harmful effects of the proposed development on European sites, there is no requirement to proceed to the next step.

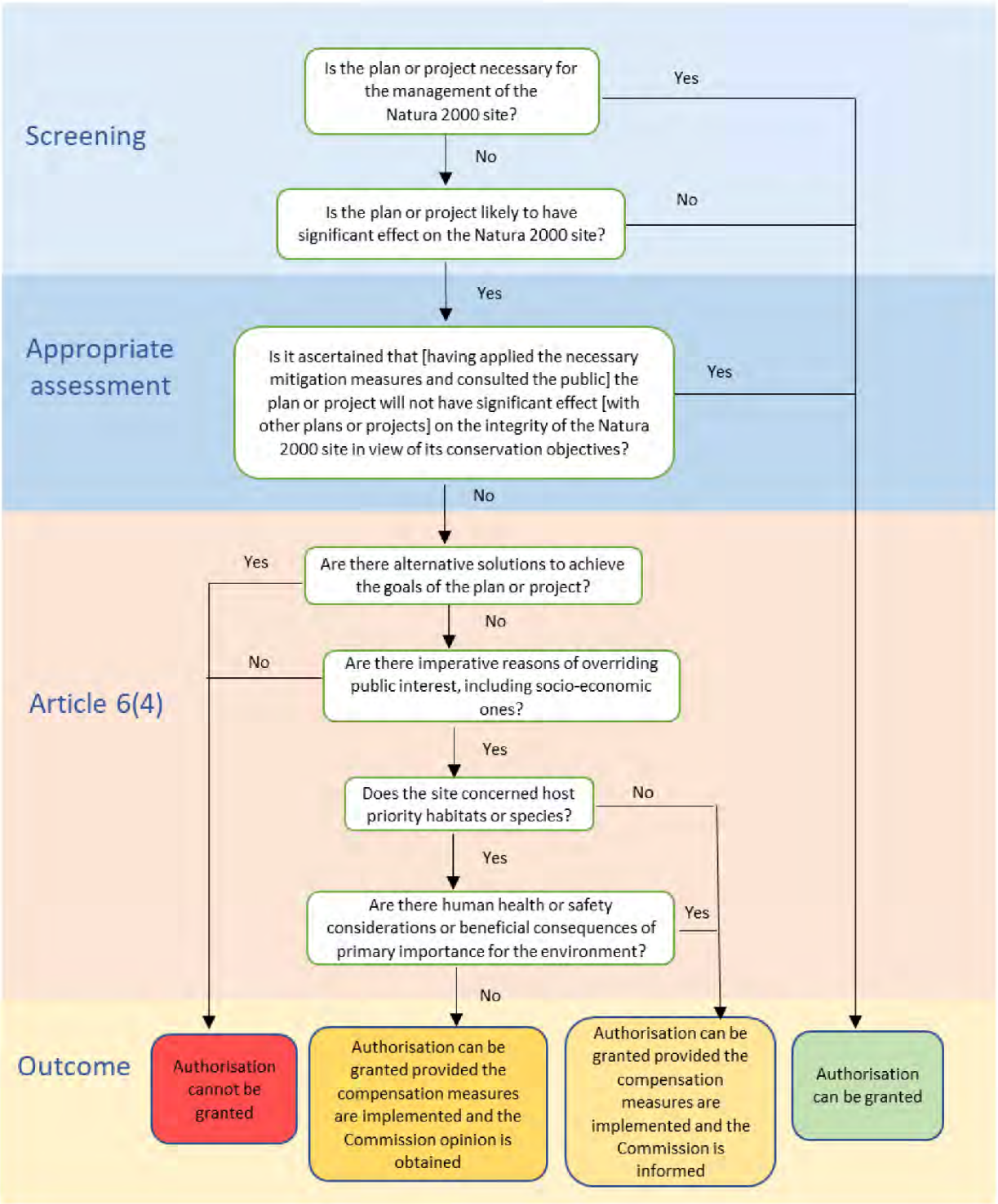


Figure 1.1: Step-wise procedure of Article 6 of the Habitats Directive (from EC, 2021)

1.2 Document Structure

1.2.1 Objective of the Document

The purpose of this document which contains information to support screening for appropriate assessment (supporting information for screening for appropriate assessment or 'SISAA') is to provide the competent authority with information to assist them in carrying out a screening for appropriate assessment of the implications of the proposed marine site investigation works project at Foynes Island on European sites in view of their conservation objectives.

This exercise has been conducted on behalf of Shannon Foynes Port Company in support of an application to the Maritime Area Regulatory Authority (MARA) under the Maritime Area Planning Act 2021.

This SISAA report seeks to assist MARA as a public authority under the 2011 Regulations in fulfilling its obligations to conduct a screening for appropriate assessment, and where applicable, an appropriate assessment.

1.2.2 Methodology and Guidance

Section 2 of the SISAA report, sets out the methodology followed and guidance documents used in conducting a screening appraisal for appropriate assessment and subsequent appraisal for appropriate assessment of the implications of the proposed development on European sites.

1.2.3 Proposed Development

Section 3 of the SISAA report describes the proposed development, the general methodology sequence and activities to be undertaken.

1.2.4 Information for Stage 1 Screening Appraisal

Section 4 of the SISAA report contains a preliminary examination and analysis to understand whether or not the proposed development is likely to have a significant effect on any European site. This is the information for screening appraisal for appropriate assessment. It has been undertaken in view of best scientific knowledge, in light of the Conservation Objectives of the sites concerned and considers the proposed development individually or in combination with other plans and projects. In accordance with EC guidance and settled case law of the CJEU, measures intended to avoid or reduce the harmful effects of the proposed development on European sites, (i.e. "mitigation measures") or best practice measures have not been taken into account in the screening stage appraisal.

2 METHODOLOGY

2.1 Published guidance on Appropriate Assessment

Appropriate Assessment Guidelines for Planning Authorities have been published by the Department of the Environment Heritage and Local Government (DEHLG, 2010a) and more recently by the Office of the Planning Regulator Practice Note (PN01) (OPR, 2021). In addition to the advice available from the Department, the European Commission has published a number of documents which provide a significant body of guidance on the requirements of Appropriate Assessment, most notably including 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*', which sets out the principles of how to approach decision making during the process. These principal national and European guidelines have been followed in the preparation this SISAA report. The following list identifies these and other pertinent guidance documents:

- Communication from the Commission on the Precautionary Principle., Office for Official Publications of the European Communities, Luxembourg (EC, 2000);
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Luxembourg (EC, 2001);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission. Office for Official Publications of the European Communities, Luxembourg (EC, 2007);
- Estuaries and Coastal Zones within the Context of the Birds and Habitats Directives - Technical Supporting Document on their Dual Roles as Natura 2000 Sites and as Waterways and Locations for Ports. Office for Official Publications of the European Communities, Luxembourg (EC, 2009);
- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, Dublin (DEHLG, 2010a);
- Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities, Dublin (DEHLG, 2010b);
- Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging. Office for Official Publications of the European Communities, Luxembourg (EC, 2011a);
- European Commission Staff Working Document 'Integrating biodiversity and nature protection into port development', Office for Official Publications of the European Communities, Luxembourg (EC, 2011b);
- European Commission Note on Setting Conservation Objectives for Natura 2000 Sites, Office for Official Publications of the European Communities, Luxembourg (EC, 2012);
- Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document, National Parks and Wildlife Service, Dublin (NPWS, 2012);
- Interpretation Manual of European Union Habitats. Version EUR 28. Office for Official Publications of the European Communities, Luxembourg (EC, 2013a);
- Guidelines on Climate Change and Natura 2000. Office for Official Publications of the European Communities, Luxembourg (EC, 2013b);

- Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects. Department of Communications, Climate Action and Environment, Dublin (DCCAE, 2017);
- 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, 2019);
- Institute of Air Quality Management 'A guide to the assessment of air quality impacts on designated nature conservation sites (Version 1.1)', London (IAQM, 2020);
- European Commission Notice C(2020) 7730 'Guidance document on wind energy developments and EU nature legislation', Office for Official Publications of the European Communities, Luxembourg (EC, 2020);
- Office of the Planning Regulator Practice Note (PN01) 'Appropriate Assessment Screening for Development Management', Dublin (OPR, 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 (EC, 2021); and
- European Commission Guidance document on Assessment of plans and projects in relation to Natura 2000 sites - A summary, Office for Official Publications of the European Communities, Luxembourg (EC, 2022).

2.2 Likely Significant Effect

The Commission's 2018 Notice (EC, 2019) advises that the appropriate assessment procedure under Article 6(3) is triggered not by the certainty but by the likelihood of significant effects, arising from plans or projects regardless of their location inside or outside a protected site. Such likelihood exists if significant effects on the site cannot be excluded. The significance of effects should be determined in relation to the specific features and environmental conditions of the site concerned by the plan or project, taking particular account of the site's conservation objectives and ecological characteristics.

The threshold for a Likely Significant Effect ("LSE") is treated in the screening exercise as being above a *de minimis* level. A *de minimis* effect is a level of risk that is too small to be concerned with when considering ecological requirements of an Annex I habitat or a population of Annex II species present on a European site necessary to ensure their favourable conservation condition. If low level effects on habitats or individuals of species are judged to be in this order of magnitude and that judgment has been made in the absence of reasonable scientific doubt, then those effects are not considered to be LSEs.

The analysis involved in a Stage 1 screening appraisal for Appropriate Assessment is described in EC (2021) as comprising four steps:

- ascertaining whether the plan or project is directly connected with or necessary to the management of a Natura 2000 site;
- identifying the relevant elements of the plan or project and their likely impacts;
- identifying which (if any) Natura 2000 sites may be affected, considering the potential effects of the plan or project alone or in combination with other plans or projects;
- assessing whether likely significant effects on the Natura 2000 site can be ruled out, in view of the site's conservation objectives.

Case law of the Court of Justice of the European Union (CJEU) has confirmed that a significant effect is triggered when:

- there is a probability or a risk of a plan or project having a significant effect on a European site;
- the plan is likely to undermine the site's conservation objectives; and
- a significant effect cannot be excluded on the basis of objective information.

EC (2021) defines a LSE as being "any effect that may reasonably be predicted as a consequence of a plan or project that would negatively and significantly affect the conservation objectives established for the habitats and species significantly present on the Natura 2000 site. This can result from either on-site or off-site activities, or through combinations with other plans or projects".

The requirement that the effect in question be 'significant' exists in order to lay down a *de minimis* or negligible threshold – thus, plans or projects that have no appreciable or imperceptible effects on the site are thereby excluded.

2.3 Mitigation Measures

In determining whether or not likely significant effects will occur or can be excluded in the Stage 1 appraisal, measures intended to avoid or reduce the harmful effects of the proposed development on European sites, (i.e. "mitigation measures") or best practice measures have not been taken into account in this screening stage appraisal. This approach is consistent with up-to-date EU guidance (EU,2019; EC,2021; EC, 2022) and the case law of the Court of Justice of the European Union (CJEU).

EC (2001) states that "project and plan proponents are often encouraged to design mitigation measures into their proposals at the outset. However, it is important to recognise that the screening assessment should be carried out in the absence of any consideration of mitigation measures that form part of a project or plan and are designed to avoid or reduce the impact of a project or plan on a Natura 2000 site". This direction in the European Commission's guidance document is unambiguous in that it does not permit the inclusion of mitigation at screening stage.

In April 2018, the Court of Justice of the European Union issued a ruling in case C-323/17 People Over Wind & Peter Sweetman v Coillte Teoranta ("People Over Wind") that Article 6(3) of Directive 92/43/EEC must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site.

The judgment in People Over Wind is reaffirmed in up-to-date EC guidance documents which refers to CJEU Case C-323/17.

2.4 Consideration of *ex-situ* effects

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

The CJEU developed this point when it issued a ruling in case C-461/17 ("Brian Holohan and Others v An Bord Pleanála") that determined inter alia that Article 6(3) of Directive 92/43/EEC must be interpreted as meaning that an appropriate assessment must on the one hand, catalogue the entirety of habitat types and species for which a site is protected, and, on the other, identify and examine both the implications of the proposed project for the species present on that site, and for which that site has not been listed, and the

implications for habitat types and species to be found outside the boundaries of that site, provided that those implications are liable to affect the conservation objectives of the site.

In that regard, consideration has been given in this Habitats Directive appraisal to implications for habitats and species located both inside and outside of the European sites considered in the screening appraisal with reference to those sites' Conservation Objectives where effects upon those habitats and/or species are liable to affect the conservation objectives of the sites concerned.

2.5 Conservation Objectives

The conservation objectives for each European site are to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the site has been selected. The favourable conservation status of a habitat is achieved when:

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

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

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

EC (2022) advises that an assessment should be done for all of the designating features (species, habitat types) that are significantly present on the site (habitats and species with A, B or C, but not D, site assessment in the Standard Data Form for the site) in view of their conservation objectives. EC (2022) additionally notes that "*the lack of site-specific conservation objectives or the establishment of conservation objectives, which are not in line with the required standard, as specified in the Commission note on "Setting conservation objectives of Natura 2000 sites" (EC, 2012), jeopardises compliance with the requirements of Article 6(3)*".

2.5.1 Site-Specific Conservation Objectives

NPWS began preparing detailed Site-Specific Conservation Objectives (SSCOs) for European sites in 2011. The European sites within the Shannon Estuary in closest proximity to the proposed development which are considered in some detail in this SISAA report have all had SSCOs set. The published SSCO documents are as described in Section 4.1 of this document.

The published SSCO documents note that an appropriate assessment based on the most up to date conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.

The most up-to-date Conservation Objectives for the European sites being considered, and details in relation to the Qualifying Interests and Special Conservation Interests of these European sites is based on publicly available data on these European Sites, sourced from the NPWS website in June 2023.

2.5.2 In-combination Effects

Article 6(3) of the Habitats Directive requires that in-combination effects with other plans or projects are also considered. As set out in the Commission's 2018 Notice (EC, 2019), significance will vary depending on factors such as magnitude of impact, type, extent, duration, intensity, timing, probability, cumulative effects and the vulnerability of the habitats and species concerned. Whilst the Directive does not explicitly define which other plans and projects are within the scope of the in-combination provision of Article 6(3), it is important to note that the underlying intention of this provision is to take account of cumulative impacts, and these will often only occur over time.

In that context, one can consider plans or projects which are completed, approved but uncompleted, or proposed. EC (2019) specifically advises [on p43] that "*as regards other proposed plans or projects, on grounds of legal certainty it would seem appropriate to restrict the in-combination provision to those which have been actually proposed, i.e. for which an application for approval or consent has been introduced*".

EC (2021) additionally advises that:

- an in-combination assessment is often less detailed at the screening stage than in the appropriate assessment;
- there is still a need to identify all other plans or projects that could give rise to cumulative impacts with the plan or project in question and
- if this analysis cannot reach definitive conclusions, it should at least identify any other relevant plans and projects that should be scrutinised in more detail during the appropriate assessment.

3 THE PROPOSED DEVELOPMENT

3.1 Wider Context

The proposed development is limited to proposed marine site investigation (SI) works within a number of areas surrounding Foynes Island, Foynes, Co. Limerick. The site boundary of the works is illustrated in Figure 3.1.

The scale of the SI works is commensurate with the level of detail required to to facilitate the preliminary and detailed design and environmental assessment of the development for the Planning and Marine Area Consent (MAC) applications of the wider proposed project which comprises the development of a new deepwater port at Foynes Island.

The quantity of boreholes required is based on the requirement for the following infrastructure within the wider port development proposals:

- 800m long open pile quay structure;
- Reclamation behind the full length of the quay structure;
- Bridge landing position moved to the north of the orchard on the Island; and
- Road corridor notionally amended to meet new bridge landing point.

Boreholes/assumed depths may be refined further by site surveys, subsequent design changes and requirements arising as a result of the environmental assessment.

3.2 Marine Geophysical Survey

A marine geophysical survey will be carried out and will cover the full area of the development footprint under water (where accessible). The aims of the survey are to:

- Identify and map potential geohazards;
- Identify and map potential archaeological sites and features;
- Facilitate the development of a ground model in support of the wider design; and
- Provide data and information in support of Environmental Impact Assessment.
- A range of instruments will be deployed for this survey including:
- GNSS positioning;
- Motion Reference Unit;
- Multibeam Echosounder;
- Sound Velocity Profiler;
- Sub-bottom Profiler, chirp;
- Side-scan Sonar, dual frequency, low and high;
- Magnetometer, caesium;
- Navigation, acquisition and processing suite;
- Post-processing navigation suite; and
- Charting software.

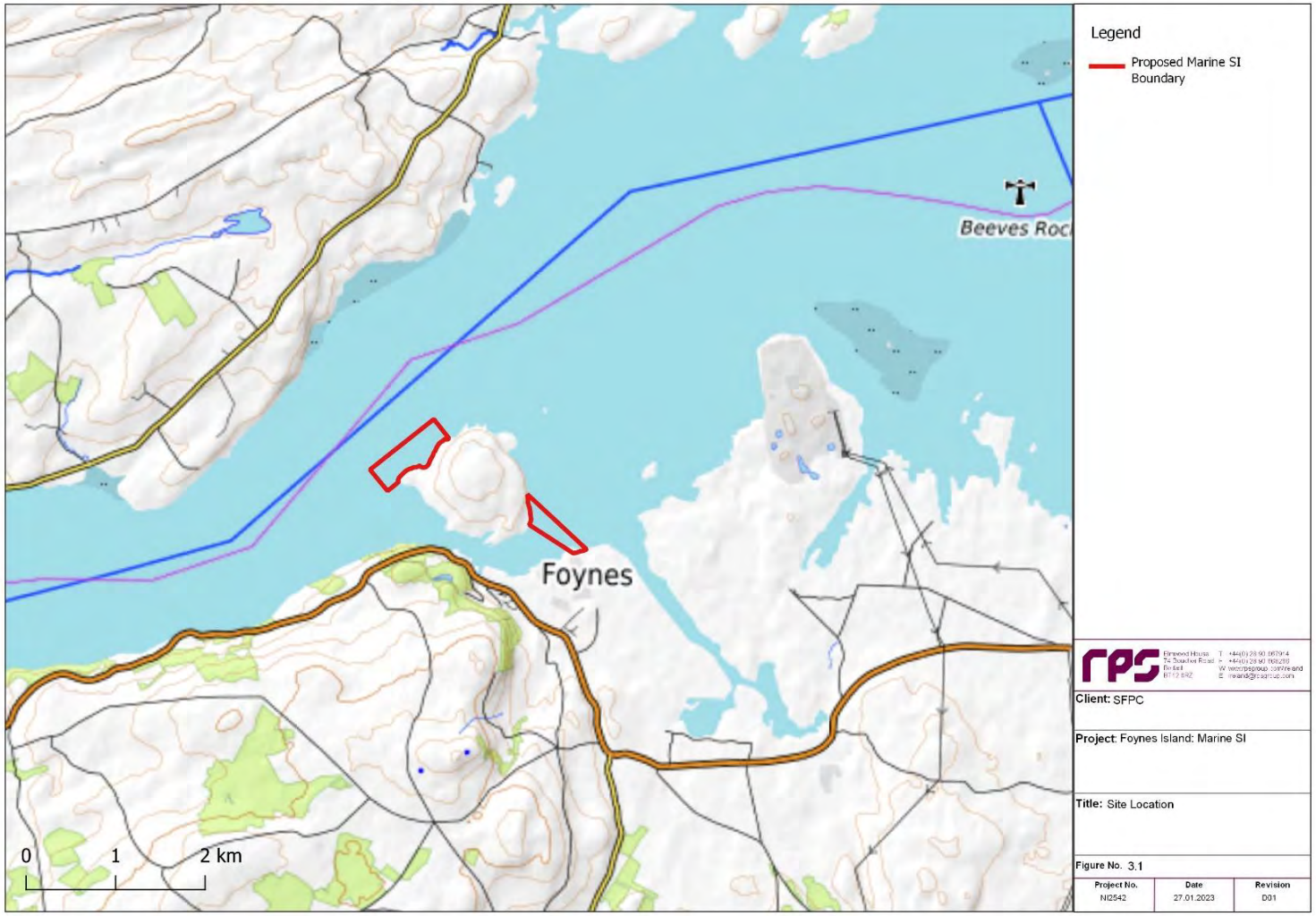


Figure 3.1: Location of the proposed Marine SI Works

The survey will be undertaken by a competent and experienced marine hydrographer and will use a Department of Marine licenced survey vessel capable of accessing all survey areas at high water. Main lines will be spaced at 20m apart in shallow waters, increasing to 50m spacing in deeper water. Cross lines will be spaced at 200m apart. Additional infill lines in shallow areas may be required to allow for full device-suite coverage at 100% and greater, thus ensuring there are no data gaps.

3.3 Marine Site Investigations

Proposed marine SI works include the follow main components over 2 phases, phase 1 planning to inform preliminary design and environmental assessment and phase 2 to inform detailed design

AREA 1 – Piled Quay and Reclamation Area Geotechnical Boreholes

- 71nr. boreholes in Phase 1 Q1/Q2 2024
- 62nr. boreholes in Phase 2 2026 for approximately 16 weeks

AREA 2 – Bridge Crossing Area Geotechnical Boreholes

- 8nr. boreholes in Phase 1
- 22nr. boreholes in Phase 2

3.3.1 Boreholes

The proposed borehole locations are illustrated at Figure 3.2.

Boreholes will consist of cable percussion drilling through soft estuarine overburden, with follow-on rotary coring for recovery of firm granular/till material and bedrock.

The boreholes are to be drilled firstly using cable percussive techniques. If rock is to be penetrated, then rotary drilling will follow on. The machinery to be used is approximately 2m tall when it is in transit and approximately 7m tall when the borehole is being driven. The machinery will be supported by a suitable jack-up barge. A typical jack-up barge arrangement will be similar to that shown in Figure 3.3.

For each borehole the footprint of the works on the foreshore will be four approximately 1 m^2 legs of the jack-up barge and the 200mm (8") temporary steel casing. The 200mm steel casing is the diameter of the borehole.

There will be no permanent structures, all site investigation will be facilitated by temporary works. The moving marine plant will remain on site for the duration of the works.

Associated sampling and testing (both in-situ and geotechnical/geo-environmental laboratory testing).

Proposed marine SI works will not require access to Foynes Island itself and will be conducted entirely from vessels within the marine environment.

3.3.2 Surface Grab Sample

It is proposed to collect surface grab samples from 16 locations within the immediate footprint of the proposed development. It is expected that 12 of these sample locations will occur in the subtidal area, and 4 locations in the intertidal area. In addition, a subtidal reef habitat has been identified along the centre of the main Shannon channel which is immediately adjacent to the development. It is expected that 10 drop down video locations will be surveyed within and adjacent to this reef community. A walkover survey will be undertaken on the hard-benthos intertidal areas within and immediately adjacent to the footprint of the hardstand area.

It is proposed to collect benthic faunal samples from 8 locations within the vicinity of the proposed bridge location. It is expected that 5 of these sample locations will occur in the subtidal area and 3 will occur in the intertidal area at the southern landfall point of the bridge. A walkover survey will be undertaken along the hard-benthos intertidal areas at both landfall locations of the bridge.

Subtidal sampling will involve the following:

- Single 0.1m2 grab samples collected at each of the subtidal sampling stations;
- An additional grab will be collected for Grainsize and Loss on Ignition;
- Ancillary information will be recorded on pre-prepared data record sheets;
- Samples will be positioned using the vessel's GPS. Sample positions will be recorded when on site;
- Photographs will be taken of each sample; and
- Drop down video footage will be collected from circa 5-10 locations within and adjacent to an extensive reef area located within Lower Shannon SAC.
- Intertidal sampling will include the following:
- Single stove-pipe core (0.028m2) will be collected at each intertidal sample station;
- A surface scrape will be collected at each site;
- Ancillary information will be recorded on pre-prepared data record sheets;
- Samples will be positioned using a hand-held GPS. Sample positions will be recorded when on site; and
- Photographs of the site will be collected at each location.

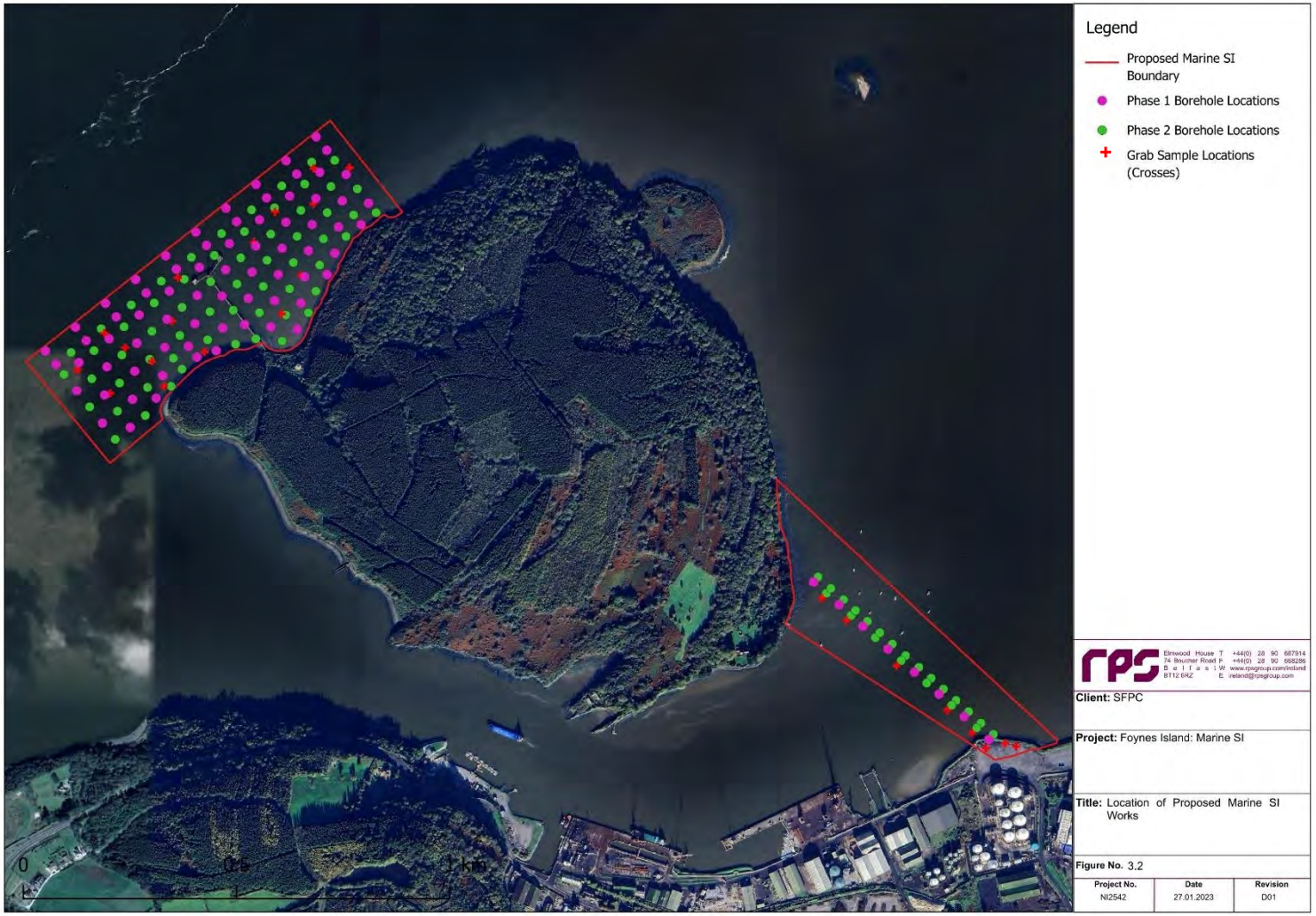


Figure 3.2: Location of the proposed Marine SI Boreholes

Figure 3.3: Typical Jack-up Barge Arrangement for Marine SI Works

4 STAGE 1 SCREENING APPRAISAL FOR APPROPRIATE ASSESSMENT

4.1 Directly Connected with or Necessary to the Management of the Site

The proposed works, which are limited to marine SI works to inform the design of a proposed deep-water port and associated infrastructure at Foynes Island, with this proposed port representing an expansion of the existing Shannon Foynes Port Company infrastructure.

On this basis, the proposed development is not directly connected with or necessary to the management of any site as a European Site.

4.2 European Sites in proximity to Foynes Island

A screening exercise must be undertaken by the competent authority to determine whether, firstly, the plan or project is directly connected with or necessary to the management of the site, and secondly, whether it is likely to have a significant effect on the site; it is governed by the first sentence of Article 6(3).

In addition, the provisions of national legislation, such as Regulation 42 of the 2011 Regulations make clear that screening for appropriate assessment of an application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site.

This screening assessment considers European sites designated under European Council Directives 92/43/EEC and 2009/147/EC. The proposed development will be screened against those European sites in order to appraise whether it is likely to have a significant effect on the site.

The most up-to-date Conservation Objectives for the European sites under consideration, and details in relation to the Qualifying Interests and Special Conservation Interests of these European sites are provided in Table 4.1.

The information contained in these tables is based on publicly available data on these European Sites and their Conservation Objectives, sourced from NPWS in January 2023.

Candidate SACs (“cSACs”), SACs and SPAs described in Table 4.1 are illustrated in Figure 4.1.

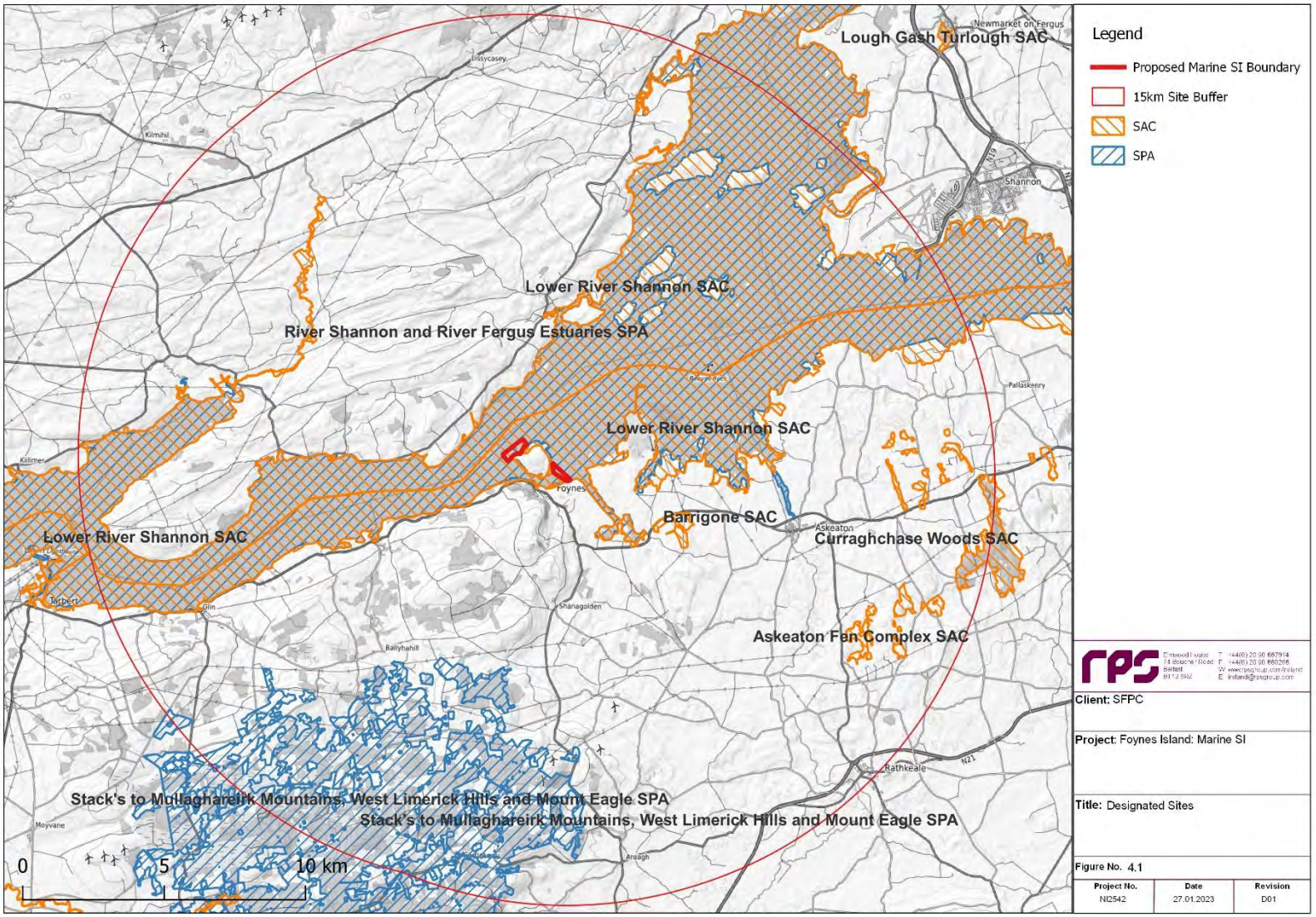


Figure 4.1: European Sites considered in the Screening Assessment

Table 4.1: Qualifying Interests and Conservation objectives of European sites considered

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
IE002165	Lower River Shannon SAC	Conservation Objectives Specific Version 1.0 (07/08/12) To maintain the favourable conservation condition of the 14 no. Annex I habitat types in the SAC, as defined by a range of attributes and targets; and of 7 no. Annex II species in the SAC, as defined by a range of attributes and targets. Annex I Habitats **Sandbanks which are slightly covered by seawater all the time [1110]**			N/A Works will take place within the SAC boundary.
		Attribute	Measure	Target	
		Habitat Distribution	Occurrence	The distribution of sandbanks is stable, subject to natural processes	
		Habitat Area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes	
		Community Distribution	Hectares	Conserve the following community type in a natural condition: Subtidal sand to mixed sediment with Nephtys spp. community complex	
		Estuaries [1130] Attribute	Measure	Target	
		Habitat Area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes	
		Community Distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Estuarine subtidal muddy sand to mixed sediment with gammarids community complex; Subtidal sand to mixed sediment with *Nucula nucleus* community complex; Subtidal sand to mixed sediment with *Nephtys spp.* community complex; Fucoid-dominated intertidal reef community complex;	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
				Faunal turf-dominated subtidal reef community; and Anemone-dominated subtidal reef community	
		Mudflats and sandflats not covered by seawater at low tide [1140]			
		Attribute	Measure	Target	
		Habitat Area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes	
		Community Distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand with *Scolelepis squamata* and *Pontocrates spp.* community; and Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex	
		Coastal lagoons [1150]			
		Attribute	Measure	Target	
		Habitat Area	Hectares	Area stable or increasing, subject to natural processes. Favourable reference area 33.4ha- Shannon Airport Lagoon 24.2ha; Cloonconeen Pool 3.9ha; Scattery Lagoon 2.8ha; Quayfield and Poulaweala Loughs 2.5ha	
		Habitat Distribution	Occurrence	No decline, subject to natural processes	
		Salinity Regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	
		Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	
		Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	
		Water quality: chlorophyll a	µg/L	Annual median chlorophyll a within natural ranges and less than 5µg/L	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges and less than 0.1mg/L	
		Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	
		Depth of macrophyte colonisation	Metres	Macrophyte colonisation to maximum depth of lagoons	
		Typical plant species	number and m2	Maintain number and extent of listed lagoonal specialists, subject to natural variation	
		Typical animal species Negative indicator species	number Number and % cover	Maintain listed lagoon specialists, subject to natural variation Negative indicator species absent or under control	
		Large shallow inlets and bays [1160] Attribute	Measure	Target	
		Habitat Area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.	
		Community Distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand with *Scolelepis squamata* and *Pontocrates spp*. community; Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Subtidal sand to mixed sediment with *Nucula nucleus* community complex; Subtidal sand to mixed sediment with *Nephtys spp*. community complex; Fucoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone- dominated subtidal reef community; and Laminaria- dominated community complex.	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Reefs [1170]			
		Attribute	Measure	Target	
		Habitat Distribution	Occurrence	The distribution of Reefs is stable, subject to natural processes	
		Habitat Area	Hectares	The permanent habitat area is stable, subject to natural processes.	
		Community Distribution	Hectares	Conserve the following reef community types in a natural condition: Fucoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone- dominated subtidal reef community; and Laminaria- dominated community complex.	
		Perennial vegetation of stony banks [1220]			
		Attribute	Measure	Target	
		Habitat Area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	
		Habitat Distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes	
		Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	
		Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	
		Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub- communities within the different zones	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	
		Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]			
		Attribute	Measure	Target	
		Habitat length	Kilometres	Area stable or increasing, subject to natural processes, including erosion. For sub- sites mapped: Kilbaha- 4.1km; Ladder Rock- 1.0km; Moyarta- 0.9km; Lisheencrony- 1.1km; Burrane- 0.2km; Kerry Head- 33.4km; Ballybunion- 15.6km; Kilclogher- 4.9km; Loop Head- 6.1km	
		Habitat Distribution	Occurence	No decline, or change in habitat distribution, subject to natural processes	
		Physical structure: functionality and hydrological regime	Occurrence of artificial barriers	No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures	
		Vegetation structure: zonation	Occurance	Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession	
		Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	
		Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in the Irish Sea cliff survey (Barron et al., 2011)	
		Vegetation composition: negative indicator species	Percentage	Negative indicator species (including non-natives) to represent less than 5% cover	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Vegetation composition: bracken and woody species	Percentage	Cover of bracken (Pteridium aquilinum) on grassland and/or heath to be less than 10%. Cover of woody species on grassland and/or heath to be less than 20%	
		Salicornia and other annuals colonising mud and sand [1310]			
		Attribute	Measure	Target	
		Habitat Area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle - 0.005ha; Inishdea, Owenshere - 0.003ha; Knock - 0.029ha; Querin - 0.185ha; Rinevilla Bay - 0.001ha	
		Habitat Distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes	
		Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	
		Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	
		Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	
		Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	
		Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	
		Vegetation structure: vegetation cover	Percentage cover at a representative sample of	Maintain more than 90% of area outside creeks vegetated	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			monitoring stop		
		Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	
		Vegetation structure: negative indicator species-Spartina anglica	Hectares	No significant expansion of common cordgrass (Spartina anglica), with an annual spread of less than 1%	
		Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]			
		Attribute	Measure	Target	
		Habitat Area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 6.774ha; Barrigone, Aughinish- 10.288ha; Beagh- 0.517ha; Bunratty- 26.939ha; Shepperton, Fergus Estuary- 37.925ha; Inishdea, Owenshere- 18.127ha; Killadysert, Inishcorker- 2.604ha; Knock- 0.576ha; Querin- 3.726ha; Rinevilla Bay- 11.883ha	
		Habitat Distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.	
		Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	
		Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	
		Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	
		Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	
		Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of the saltmarsh area vegetated	
		Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stop	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	
		Vegetation structure: negative indicator species- Spartina anglica	Hectares	No significant expansion of common cordgrass (Spartina anglica), with an annual spread of less than 1%	
		Mediterranean salt meadows (*Juncetalia maritimi*) [1410]			
		Attribute	Measure	Target	
		Habitat Area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 4.193ha; Barrigone, Aughinish- 2.407ha; Bunratty- 0.865ha; Inishdea, Owenshere- 11.609ha; Killadysert, Inishcorker- 0.705ha; Knock- 0.143ha, Querin- 0.008ha; Rinevilla Bay- 2.449ha	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Habitat Distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes	
		Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	
		Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	
		Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	
		Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	
		Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	
		Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	
		Vegetation composition: typical species	Percentage cover	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Vegetation structure: negative indicator species - Spartina anglica	Hectares	No significant expansion of common cordgrass (Spartina anglica), with an annual spread of less than 1%	
		Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]			
		Attribute	Measure	Target	
		Habitat Area	Kilometres	Area stable or increasing, subject to natural processes	
		Habitat Distribution	Occurrence	No decline, subject to natural processes	
		Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	
		Hydrological regime: tidal influence	Daily water level fluctuations - metres	Maintain natural tidal regime	
		Hydrological regime: freshwater seepages	Metres per second	Maintain appropriate freshwater seepage regimes	
		Substratum composition: particle size range	Millimetres	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)	
		Water quality: nutrients	Milligrammes per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	
		Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	
		Floodplain connectivity	Area	The area of active floodplain at and upstream of the habitat should be maintained	
		Riparian habitat	Area	The area of riparian woodland at and upstream of the bryophyte-rich sub-type should be maintained	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410]			
		Attribute	Measure	Target	
		Habitat Area	Hectares	Area stable or increasing, subject to natural processes	
		Habitat Distribution	Occurrence	No decline, subject to natural processes	
		Vegetation structure: broadleaf herb: grass ratio	Percentage	Broadleaf herb component of vegetation between 40 and 90%	
		Vegetation structure: sward height	Percentage	30-70% of sward between 10 and 80cm high	
		Vegetation composition: typical species	Number	At least 7 positive indicator species present, including 1 "high quality" species	
		Vegetation composition: notable species	Number	No decline, subject to natural processes	
		Vegetation composition: negative indicator species	Percentage	Negative indicator species collectively not more than 20% cover, with cover by an individual species less than 10%. Non-native invasive species, absent or under control	
		Vegetation composition: negative indicator moss species	Percentage	Bog mosses (Sphagnum spp.) not more than 10% cover; hair mosses (Polytrichum spp.) not more than 25% cover	
		Vegetation structure: woody species and bracken (Pteridium aquilinum)	Percentage	Cover of woody species and bracken not more than 5% cover	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Physical structure: bare ground	Percentage	Not more than 10% bare ground	
		Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae)* [91E0]			
		Attribute	Measure	Target	
		Habitat Area	Hectares	Area stable or increasing, subject to natural processes, at least c.8.5ha for sites surveyed	
		Habitat Distribution	Occurrence	No decline	
		Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and “small” woods at least 3ha in size	
		Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi- mature trees and shrubs; and well-developed herb layer	
		Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	
		Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	
		Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Woodland structure: dead wood	m2 woodland structure: dead wood	At least 30m³/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	
		Woodland structure: veteran trees	Number per hectare	No decline	
		Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	
		Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	
		Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (Alnus glutinosa), willows (Salix spp) and, locally, oak (Quercus robur) and ash (Fraxinus excelsior)	
		Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	
		***Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]**			
		Attribute	Measure	Target	
		Distribution	Kilometres	Maintain at 7km.	
		Population size	Number of adult mussels	Restore to 10,000 adult mussels	
		Population structure: recruitment	Percentage per size class	Restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	
		Habitat extent	kilometres	Restore suitable habitat in more than 3.3km (see map 15) and any additional stretches necessary for salmonid spawning	
		Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93	
		Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants)	Percentage	Restore substratum quality- filamentous algae: absent or trace (<5%)	
		Substratum quality: sediment	Occurrence	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	
		Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate	
		Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regimes	
		Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	
		***Petromyzon marinus* (Sea Lamprey) [1095]**			
		Attribute	Measure	Target	
		Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	
		Population structure of juveniles	Number of age/size groups	At least three age/size groups present	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Juvenile density in fine sediment	Juveniles/m²	Juvenile density at least 1/m²	
		Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	
		Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	
		***Lampetra planeri* (Brook Lamprey) [1096]**			
		Attribute	Measure	Target	
		Distribution	% of river accessible	Access to all water courses down to first order streams	
		Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	
		Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of brook/river lamprey at least 2/m²	
		Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning bed	
		Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream	More than 50% of sample sites positive	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			of spawning areas		
		***Lampetra fluviatilis* (River Lamprey) [1099]**			
		Attribute	Measure	Target	
		Distribution	% of river accessible	Access to all water courses down to first order streams	
		Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	
		Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of river/brook lamprey at least 2/m²	
		Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	
		Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	
		***Salmo salar* (Salmon) [1106]**			
		Attribute	Measure	Target	
		Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	
		Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Salmon fry abundance	Number of fry/5 minutes electrofishing	g Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	
		Out-migrating smolt abundance	Number	No significant decline	
		Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	
		Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	
		***Tursiops truncatus* (Common Bottlenose Dolphin) [1349]**			
		Attribute	Measure	Target	
		Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use	
		Habitat use: critical areas	Location and hectares	Critical areas, representing habitat used preferentially by bottlenose dolphin, should be maintained in a natural condition.	
		Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the bottlenose dolphin population at the site	
		***Lutra lutra* (Otter) [1355]**			
		Attribute	Measure	Target	
		Distribution	Percentage positive survey sites	No significant decline	
		Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds	
		Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 4,461.6ha	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Extent of freshwater (river) habitat	Kilometers	No significant decline. Length mapped and calculated as 500.1km	
		Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 125.6ha	
		Couching sites and holts	Number	No significant decline	
		Fish biomass available	Kilograms	No significant decline	
		Barriers to connectivity	Number	No significant increase	
IE004077	River Shannon and River Fergus Estuaries SPA	Conservation Objectives Specific Version 1.0 (17/09/12) To maintain the favourable conservation condition of – 21 no. overwintering species in the SPA, as defined by 2 no. attributes and targets; 1 no. breeding species Cormorant, as defined by a wider range of attributes and targets; and wetland habitats in the SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, as defined by 1 no. attribute and target. Special Conservation Interests Cormorant (Phalacrocorax carbo) [A017]			N/A Works will take place within the SPA boundary
		Attribute	Target	Measure	
		Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	
		Productivity rate	Mean number	No significant decline	
		Distribution: breeding colonies	Number; location; area (hectares)	No significant decline	
		Prey biomass available	Kilogrammes	No significant decline	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	
		Disturbance at the breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding cormorant population	
		Population trend	Percentage change	Long term population trend stable or increasing	
		Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by cormorant other than that occurring from natural patterns of variation	
		Wintering Waterbirds including: Cormorant (Phalacrocorax carbo) [A017], Whooper Swan (Cygnus cygnus) [A038], Light-bellied Brent Goose (Branta bernicla hrota) [A046], Shelduck (Tadorna tadorna) [A048], Wigeon (Anas penelope) [A050], Teal (Anas crecca) [A052], Pintail (Anas acuta) [A054], Shoveler (Anas clypeata) [A056], Scaup (Aythya marila) [A062], Ringed Plover (Charadrius hiaticula) [A137], Golden Plover (Pluvialis apricaria) [A140], Grey Plover (Pluvialis squatarola) [A141], Lapwing (Vanellus vanellus) [A142], Knot (Calidris canutus) [A143], Dunlin (Calidris alpina) [A149], Black-tailed Godwit (Limosa limosa) [A156], Bar-tailed Godwit (Limosa lapponica) [A157], Curlew (Numenius arquata) [A160], Redshank (Tringa totanus) [A162], Greenshank (Tringa nebularia) [A164] and Black-headed Gull (Chroicocephalus ridibundus) [A179]			
		Attribute	Target	Measure	
		Population trend	Percentage change	Long term population trend stable or increasing	
		Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by the relevant species other than that occurring from natural patterns of variation	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Wetland and Waterbirds [A999]			
		Attribute	Target	Measure	
		Wetland habitat area	hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 32,261ha, other than that occurring from natural patterns of variation	
IE000432	Barrigone SAC	Conservation Objectives Specific Version 1.0 (15/02/19) To maintain the favourable conservation condition of the three no. Annex I habitat types in the SAC, as defined by a range of attributes and targets; and a single Annex II species in the SAC, as defined by three no. attributes and targets. Annex I Habitats Juniperus communis formations on heaths or calcareous grasslands [5130]			3.5km
		Attribute	Measure	Target	
		Habitat area	Hectares	Area stable or increasing, subject to natural processes	
		Habitat distribution	Occurrence	No decline, subject to natural processes.	
		Juniper formation size	Number and proximity of juniper plants	At least 50 juniper plants present with each plant separated by no more than 20m	
		Vegetation structure: female fruiting plants	Percentage in a representative number of 5m x 5m monitoring stops or in an ad hoc count of 50 plants	Fruiting females comprise at least 10% of juniper plants rooted in plot in at least 50% of stops or in an ad hoc count of 50 plants	

Site Code	Site Name	Qualifying Interests & Conservation Objectives		Distance from proposed project
		Vegetation structure: seedling recruitment	Presence in a representative number of 5m x 5m monitoring stops At least one seedling recorded in at least one monitoring stop	
		Vegetation structure: live juniper	Percentage in a representative number of 5m x 5m monitoring stops or across the site as a whole At least 90% of juniper plants rooted in plot alive in at least 75% of stops or across the site as a whole	
		Vegetation composition: negative indicator species	Percentage in a representative number of 5m x 5m monitoring stops Total cover of negative indicator species to be less than 10% in at least 50% of stops	
		Physical structure: germination niches	Percentage in a representative number of 5m x 5m At least 5% bare soil and/or at least 5% bare rock in at least 50% of stops	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			monitoring stops		
		Formation structure: browning/die-back of plants	Percentage of juniper cover in a representative number of 5m x 5m monitoring stops	Browning or dead juniper branches (excluding fully dead plants) comprise no more than 20% of total juniper cover in plot in at least 75% of stops	
		Formation structure: evidence of browsing and bark stripping	Occurrence across a representative number of 5m x 5m monitoring stops	Recent browsing of juniper plants and bark stripping and trampling due to browsers evident in no more than 50% of stops	
		Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]			
		Attribute	Measure	Target	
		Habitat area	Hectares	Area stable or increasing, subject to natural processes; at least 5.85ha for the sub-site (Barrigone - site code 2701) mapped	
		Habitat distribution	Occurrence	No decline, subject to natural processes.	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Vegetation composition: positive indicator species	Number at a representative number of 2m x 2m monitoring stops; within 20m surrounding area of monitoring stops	At least 7 positive indicator species present in monitoring stop or, if 5–6 present in stop, additional species within 20m of stop; this includes at least two 'high quality' positive indicator species present in stop or within 20m of stop	
		Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	
		Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of non-native species not more than 1%	
		Vegetation composition: woody species and bracken	Percentage cover at a representative number of 2m	Cover of woody species (except certain listed species) and bracken (Pteridium aquilinum) not more than 5%	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			x 2m monitoring stops		
		Vegetation structure: broadleaf herb:grass ratio	Percentage at a representative number of 2m x 2m monitoring stops	Broadleaf herb component of vegetation between 40% and 90%	
		Vegetation structure: sward height	Percentage at a representative number of 2m x 2m monitoring stops	At least 30% of sward between 5cm and 40cm tall	
		Vegetation structure: litter	Percentage cover at a representative number of 2m x 2m monitoring stops	Litter cover not more than 25%	
		Physical structure: bare soil	Percentage cover at a representative	Not more than 10% bare soil	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			number of 2m x 2m monitoring stops		
		Physical structure: grazing or disturbance	Area in local vicinity of a representative number of monitoring stops	Area of the habitat showing signs of serious grazing or disturbance less than 20m²	
		Limestone pavements [8240]			
		Attribute	Measure	Target	
		Habitat area	Hectares	Area stable or increasing, subject to natural processes	
		Habitat distribution	Occurrence	No decline	
		Vegetation composition: positive indicator species	Number at a representative number of monitoring stops	At least seven positive indicator species present	
		Vegetation composition: bryophyte layer	Percentage at a representative number of monitoring stops	Bryophyte cover at least 50% on wooded pavement	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Collective cover of negative indicator species on exposed pavement not more than 1%	
		Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration	
		Vegetation composition: scrub	Percentage at a representative number of monitoring stops	Scrub cover no more than 25% of exposed pavement	
		Vegetation composition: bracken cover	Percentage at a representative number of monitoring stops	Bracken (Pteridium aquilinum) cover no more than 10% on exposed pavement	
		Vegetation structure: woodland canopy	Percentage at a representative number of	Canopy cover on wooded pavement at least 30%	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			monitoring stops		
		Vegetation structure: dead wood	Occurrence in a representative number of monitoring stops	Sufficient quantity of dead wood on wooded pavement to provide habitat for saproxylic organisms	
		Physical structure: disturbance	Occurrence in a representative number of monitoring stops	No evidence of grazing pressure on wooded pavement	
		Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	
		Euphydryas aurinia (Marsh Fritillary) [1065]			
		Attribute	Measure	Target	
		Distribution: occupied 1km grid squares	Number	Confirmed records	
		Proof or breeding: larval webs	Number at a representative number of sub-sites	Proof of breeding, confirmed by detection of webs	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Potential habitat: area	Hectares	Area of potential habitat stable or increasing, subject to natural processes	
IE004161	Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	Conservation Objectives Specific Version 1.0 (17/09/12) To maintain the favourable conservation condition of – One no. breeding species, hen harrier, as defined by eight no. attributes and targets; and Special Conservation Interests Hen Harrier (Circus cyaneus) [A082]			7.6km
		Attribute	Measure	Target	
		Population size	Number of confirmed breeding pairs	Restore the numbers of confirmed breeding pairs to at least 38–39 confirmed breeding pairs	
		Productivity rate	Number of fledged young per confirmed pair	Maintain at least 1.0–1.4 fledged young per confirmed pair	
		Spatial utilisation by breeding pairs	Percentage	Restore the spatial utilisation of the SPA by breeding pairs to at least 97–98 %	
		Extent and condition of heath and bog and associated habitats	Hectares; condition assessment	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation	
		Extent and condition of low intensity managed grasslands and associated habitats	Hectares; condition assessment	Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Extent and condition of hedgerows	Kilometres; condition assessment	Maintain at least the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation	
		Age structure of forest estate	Percentage	Achieve an even and consistent distribution of age-classes across the forest estate	
		Disturbance to breeding sites	Level of impact	Disturbance occurs at levels that does not significantly impact upon breeding hen harrier	
002279	Askeaton Fen Complex SAC	Conservation Objectives Specific Version 1.0 (18/05/18) To maintain the favourable conservation condition of the two no. Annex I habitat types in the SAC, as defined by a range of attributes and targets. Annex I Habitats Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210]			11.3km
		Attribute	Measure	Target	
		Habitat area	Hectares	Area stable or increasing, subject to natural processes	
		Habitat distribution	Occurrence	No decline, subject to natural processes	
		Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	Maintain active peat formation, where appropriate	
		Ecosystem function: hydrology - groundwater levels	Water levels (centimetres); duration of	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			levels; hydraulic gradients		
		Ecosystem function: hydrology - surface water flow	Drain density and form	Maintain, or where necessary restore, as close as possible to natural or semi-natural drainage conditions	
		Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	
		Vegetation composition: typical species	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain adequate cover of typical species, including brown mosses and vascular plants	
		Vegetation composition: native negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of native negative indicator species at insignificant levels	
		Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative	Cover of non-native species less than 1%	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			number of 2m x 2m monitoring stops		
		Vegetation composition: trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	
		Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground not more than 10%. Where tufa is present, disturbed bare ground not more than 1%	
		Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Alkaline fens [7230]			
		Attribute	Measure	Target	
		Habitat area	Hectares	Area stable or increasing, subject to natural processes	
		Habitat distribution	Occurrence	No decline, subject to natural processes	
		Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	
		Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	Maintain active peat formation, where appropriate	
		Ecosystem function: hydrology - groundwater levels	Water levels (centimetres); duration of levels; hydraulic gradients	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Ecosystem function: hydrology - surface water flow	Drain density and form	Maintain, or where necessary restore, as close as possible to natural or semi-natural drainage conditions	
		Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	
		Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	
		Vegetation composition: brown mosses	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain adequate cover of typical brown moss species	
		Vegetation composition: typical vascular plants	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain adequate cover of typical vascular plant species	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Vegetation composition: native negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of native negative indicator species at insignificant levels	
		Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	
		Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	
		Vegetation composition: soft rush and common reed cover	Percentage cover in local vicinity of a representative number of	Total cover of soft rush (Juncus effusus) and common reed (Phragmites australis) less than 10%	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			monitoring stops		
		Vegetation structure: litter	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of litter not more than 25%	
		Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground not more than 10%	
		Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	
		Indicators of local distinctiveness	Occurrence and	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
			population size		
000174	Curraghchase Woods SAC	Conservation Objectives Specific Version 1.0 (18/05/18) To maintain the favourable conservation condition of the two no. Annex I habitat types in the SAC, as defined by a range of attributes and targets and the two number Annex II species in the SAC, as defined by a range of attributes and targets. Annex I Habitats Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]			13.7km
			Attribute	Target	Measure
			Habitat area	Hectares	Area stable or increasing, subject to natural processes
			Habitat distribution	Occurrence	No decline, subject to natural processes. See map 2 for surveyed woodland locations
			Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and “small” woods at least 3ha in size
			Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semimature trees and shrubs; and well-developed herb layer
			Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types
			Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	
		Woodland structure: dead wood	m³ per hectare; number per hectare	At least 30m³/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder (Alnus glutinosa))	
		Woodland structure: veteran trees	Number per hectare	No decline	
		Woodland structure: indicators of local distinctiveness	Occurrence	No decline	
		Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	
		Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (Alnus glutinosa), willows (Salix spp.), oak (Quercus spp.), ash (Fraxinus excelsior) and birch (Betula pubescens)	
		Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	
		Taxus baccata woods of the British Isles [91J0]			
		Attribute	Measure	Target	
		Habitat area	Hectares	Area stable or increasing, subject to natural processes.	
		Habitat distribution	Occurrence	No decline, subject to natural processes.	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Woodland size	Hectares	Area stable or increasing	
		Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semimature trees and shrubs; and herb and bryophyte layer	
		Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	
		Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	
		Woodland structure: dead wood	m^3 per hectare; number per hectare	At least 30m^3/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	
		Woodland structure: veteran trees	Number per hectare	No decline	
		Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	
		Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	
		Vegetation composition: typical species	Occurrence	A variety of typical native species present, including yew (Taxus baccata) and ash (Fraxinus excelsior)	
		Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	
		Vertigo moulinsiana (Desmoulin's Whorl Snail) [1016]			
		Attribute	Measure	Target	

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Distribution	Number of occupied 1km squares	No decline, subject to natural processes. There is one known site for this species in the SAC within the 1km grid squares R4148 and R4149.	
		Occurrence in suitable habitat	Percentage positive records in a representative number of samples	No decline, subject to natural processes. A baseline figure of 50% positive samples is set	
		Habitat area	Hectares	Area of suitable habitat stable or increasing, subject to natural processes; no less than 1.8ha of at least sub-optimal habitat	
		Habitat quality	Percentage of samples classified as suitable habitat	No decline, subject to natural processes	
		Habitat quality: soil wetness	Soil wetness criteria	No decline, subject to natural processes	
		Habitat quality: water levels	Hydrological regime	Maintain at current levels, subject to natural processes	
		Habitat quality: vegetation structure	Grazing levels	No increase in grazing levels	
		Tree canopy extent	Percentage cover	Tree canopy cover around lake stable at current levels, subject to natural processes	
		Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303]			

Site Code	Site Name	Qualifying Interests & Conservation Objectives			Distance from proposed project
		Attribute	Measure	Target	
		Population per roost	Number	Minimum number of 100 bats for the summer roost (linked roost ids 659 and 852 in NPWS database); minimum number of 81 bats for the winter roost (roost id. 659).	
		Winter roosts	Condition	No decline	
		Summer roosts	Condition	No decline	
		Auxiliary roosts	Number and condition	No decline	
		Extent of potential foraging habitat	Hectares	No significant decline within 2.5km of qualifying roosts	
		Linear features	Kilometres	No significant loss within 2.5km of qualifying roosts	
		Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roosts or along commuting routes within 2.5km of those roosts. See map 4	

4.3 Establishing an Impact Pathway

The possibility of significant effects is considered in this SISAA report using the source-pathway-receptor model. 'Source' is defined as the individual elements of the proposed works that have the potential to affect the identified ecological feature (or receptor). 'Pathway' is defined as the means or route by which a source can affect the ecological receptor. 'Ecological receptor' is defined as the Special Conservations Interests (for SPAs) or Qualifying Interests (of SACs/cSACs) for which conservation objectives have been set for the European sites under consideration (refer to Table 4.1). Each element can exist independently however an effect is created when there is a linkage between the source, pathway and receptor. Possible effects are discussed under four themes:

- Habitat loss;
- Water quality and habitat deterioration;
- Underwater noise and disturbance; and
- Aerial noise and visual disturbance.

4.4 Potential Effects

4.4.1 Habitat Loss

The proposed marine site investigations work area lies within two European sites, namely the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA. The works area does not lie within or in proximity to any other European sites.

The proposed Marine SI works will take place within areas of the Lower River Shannon SAC which support the following Annex I habitats:

- Estuaries [1130] – 54 no. Cable percussive boreholes (Phase 1); 54 No. Cable percussive boreholes (Phase 2); and 15 Benthic grab samples.
- Mudflats and sandflats not covered by seawater at low tide [1140] - 17 Cable percussive boreholes (Phase 1); 19 Cable percussive boreholes (Phase 2); and 8 Benthic grab samples.
- Reefs [1170] - 8 Cable percussive boreholes (Phase 1); 11 Cable percussive boreholes (Phase 2); and one benthic grab sample.

The distribution of Annex I habitats within the Lower River Shannon SAC in the context of proposed borehole locations and grab samples is illustrated at Figure 4.2-4.4. Areas of mudflats and sandflats [1140] Annex I habitat are also considered to represent wetland habitat which forms a qualifying interest of the River Shannon and River Fergus Estuaries SPA.

The methodology proposed for borehole drilling will utilise a cable percussive approach through soft overburden and, where required, follow-on rotary coring for recovery of firm granular/till material and bedrock. The legs of the jack-up rig from which the works will take place will cover an area of $1m^2$ each (for a combined total of $4m^2$), while the boreholes themselves will be drilled within a steel casing 200mm in diameter.

Table 4.2 details the predicted areas within each of the Annex I habitats within the Lower River Shannon SAC, to be affected by the proposed borehole drilling, at both phases. It is noted that the entire Marine SI area is mapped as being Annex I habitats: estuaries. This mapping overlaps that of the Annex I habitats reefs and mudflats and sandflats and as such boreholes within these habitats have been subtracted from the number within estuaries habitats to avoid double counting of areas.

Table 4.2: Predicted areas of Annex I habitats within Lower River Shannon SAC to be affected by the proposed Marine SI works (both phases).

Annex I Habitat	No. Boreholes Proposed	Total Area of Proposed Boreholes (m^2)	Total Cumulative Area of Jack-up Rig Footings (m^2)	Total Area Affected (m^2)	Total area of Annex I Habitat within SAC (ha)	Percentage of Total Area Affected (%)
Estuaries [1130]	108	3.39	432	435.39	24,273	0.00018
Mudflats and Sandflats [1140]	36	1.13	144	145.13	8,808	0.00016
Reefs [1170]	19	0.60	76	76.6	21,421	0.000036

Potential impacts associated with the deployment of the jack-up rig footings will be extremely short-term in nature and will only temporarily disturb the marine bed. These potential impacts are predicted to be similar to the deployment of a boat anchor within the relevant habitats and will not give rise to any alterations to these habitats beyond the short-term. The areas over which these effects would occur are extremely small in the context of the areas of the relevant Annex I habitats supported across the SAC.

On this basis it is considered that the proposed use of a jack-up rig and associated footing on the estuary bed, to undertake marine SI works, will give rise to no likely significant loss of habitat within the Lower River Shannon SAC or the likely significant loss of wetland habitats within the River Shannon and River Fergus Estuaries SPA.

The proposed borehole creation, within the relevant areas of Annex I habitats, will involve the direct disturbance of a 200mm wide circle of habitat, per borehole, for estuary and mudflat habitats. Direct disturbance of the habitat associated with borehole creation will be extremely temporary in nature, as it is anticipated that borehole locations will be subject to rapid and natural filling by surrounding sediments following completion of the works, through normal tidal action and other natural processes. These effects will occur within an energetically active marine environment which supports significant quantities of mobile sediment as part of the natural process occurring throughout the estuary including the areas proposed for SI works. The proposed borehole creation will also involve a direct impact of seabed habitat loss of a 200mm wide circle of habitat, per borehole, for reef where it occurs. For all habitat types affected by the works, the areas over which such effects would occur are extremely small in the context of the areas of the relevant Annex I habitats across the SAC, being a very small fraction of one percent, as set out at Table 4.2.

Proposed grab sampling will involve the removal of a maximum of 0.1m^2 of material at each sample location. It is considered that such small sample volumes will have no potential to give rise to likely significant effects upon any Annex I habitat within the SAC through habitat loss.

It is considered that the proposed marine boreholes would have potential to lead to likely significant effects through direct disturbance of habitat within both the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Further analysis or the implementation of mitigation measures is therefore required at Appropriate Assessment stage.

Consideration is given in the following section as to whether the proposed project would result in other indirect effects upon habitats supported within these European sites, given their close proximity to the proposed works.

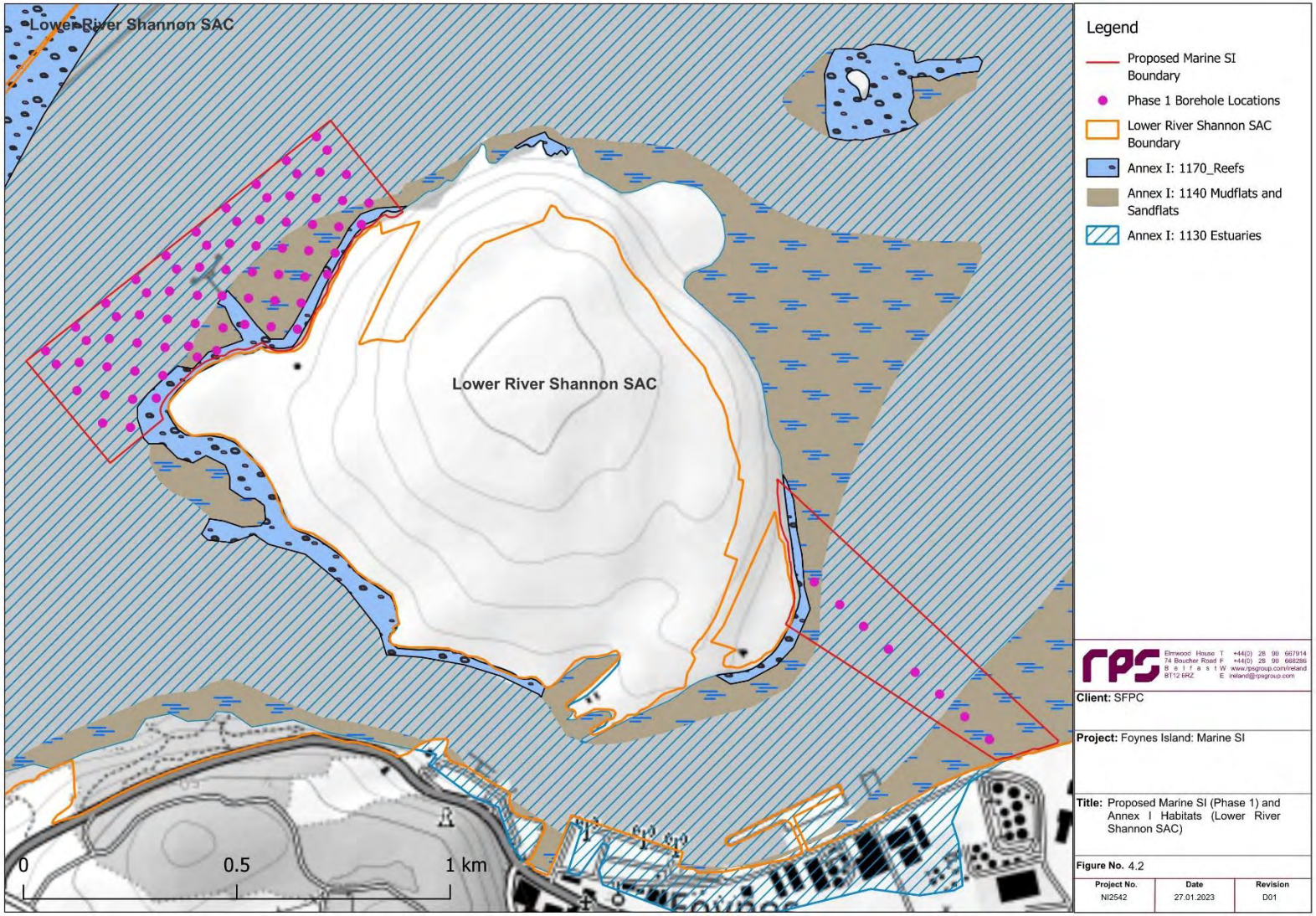


Figure 4.2: Proposed Borehole Locations (Phase 1) and Annex I Habitats (Lower River Shannon SAC)

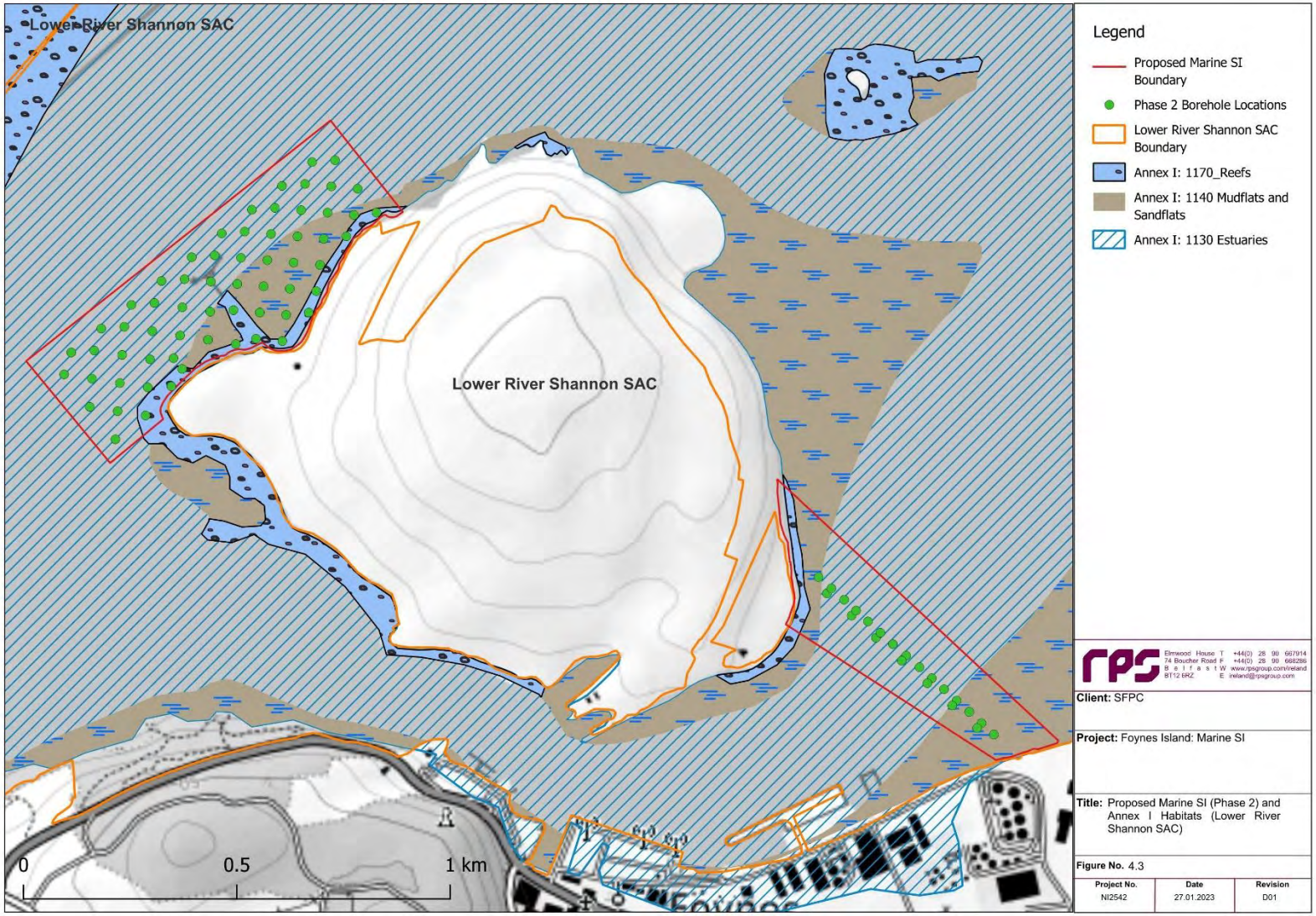


Figure 4.3: Proposed Borehole Locations (Phase 2) and Annex I Habitats (Lower River Shannon SAC)

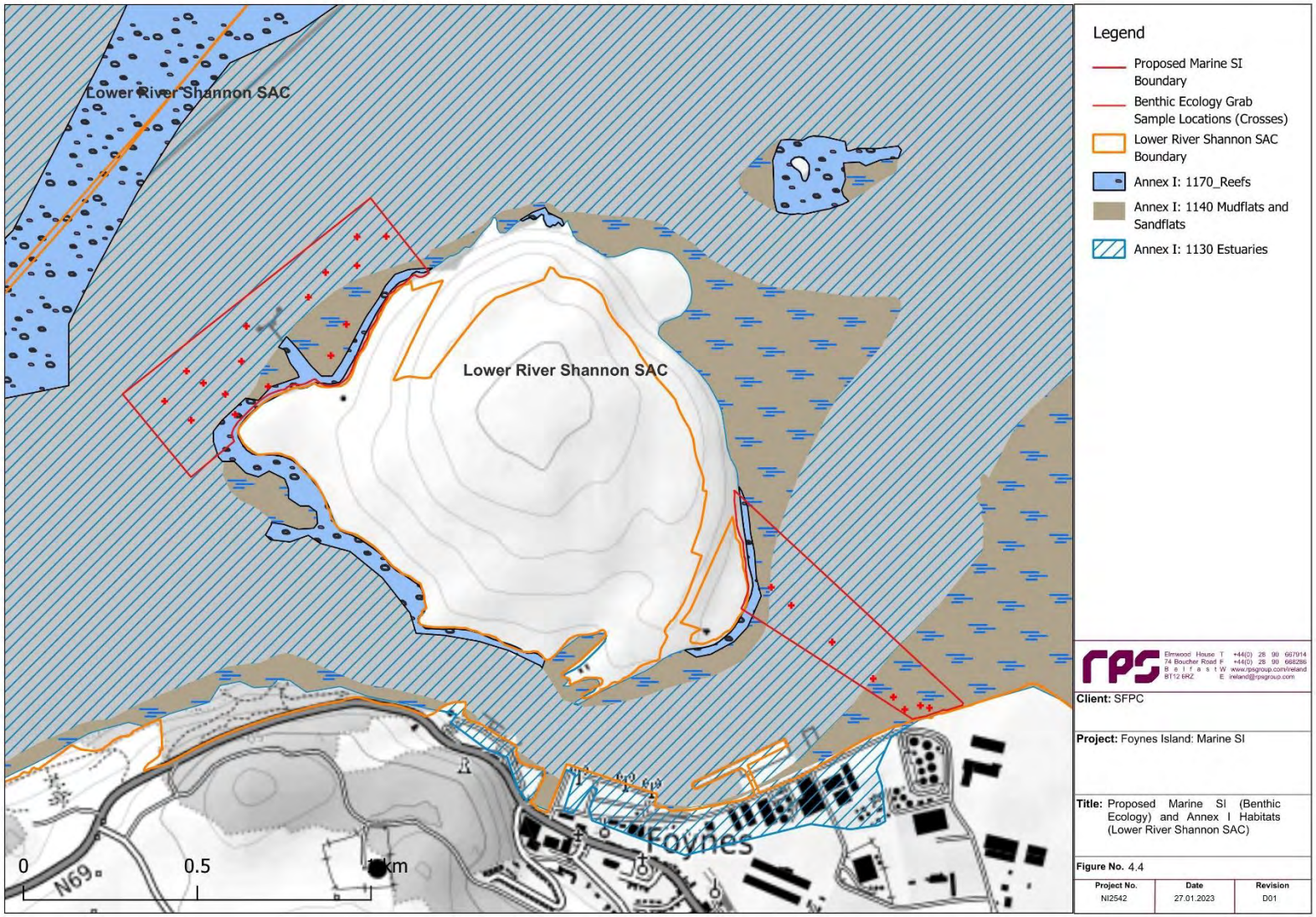


Figure 4.4: Proposed Benthic Ecology Grab Sample Locations and Annex I Habitats (Lower River Shannon SAC)

4.4.2 Water Quality and Habitat Deterioration

4.4.2.1 Suspended Solids

The proposed works will result in disturbance to the estuary bed, both through the placement of jack-up rig footings and through the creation of the borehole itself. The methodology proposed for borehole drilling will involve cable percussive drilling through soft overburden. This methodology, which is less energetic than rotary drilling, will give rise to fairly minimal dispersal of sediments, with the coring taking place within the 200mm steel casing. While rotary drilling will subsequently be utilised to penetrate underlying bedrock, as required, this will occur at great depths and as such surrounding overburden is likely to limit the dispersal of sediments. Again, rotary drilling will take place within the 200mm steel casing which will also limit, to a certain extent, arising suspended sediments. The works will not involve the use of additional substances which could enter the water column as suspended solids, with any arising suspended sediments being limited to natural materials already present within the estuarine environment.

The proposed borehole drilling will take place on the bed of estuarine waters which are subject to significant sediment transport associated with the tidal action on soft overburdens including sand and mud and significant suspended sediments which are washed down into the estuary from the River Shannon and River Fergus catchments, with the Shannon Estuary in total drawing from an inland catchment of approximately 17,963km^2.

Habitats within proximity to the proposed SI works are estuarine and intertidal habitats including reefs and mudflats and sandflats. These habitats are not particularly sensitive to adverse effects associated with the movements of small quantities of suspended and subsequently deposited sediments, as such habitats will interact with such sediments continuously as transport occurs throughout the estuary system.

Annex II species for which the Lower River Shannon SAC is designated include a range of species which are sensitive to sedimentation including freshwater pearl mussel, sea lamprey, brook lamprey, river lamprey and salmon. The sensitivity of these species to adverse effects associated with sedimentation is largely limited to the headwaters of freshwater watercourses in which the species breed. The proposed works lie downstream of all freshwater habitats within the SAC and as such have no potential to give rise to likely significant effects upon freshwater pearl mussel or breeding habitats of importance for QI fish species. It is considered that the proposed works, given the small quantities of sediment likely to arise, would have no potential to give rise to any likely significant adverse effects upon QI fish species of the Lower River Shannon SAC during the adult portion of their life cycle.

Given that potential sedimentation effects arising as a result of the proposed works will be extremely minimal in nature and will occur over a short period of time, and in the context of information set out above, it is considered that there will be no potential for adverse effects upon non-QI fish species within the area proposed for works. As such it is considered that the proposals would have no potential to give rise to likely significant sedimentation effects upon foraging otter within proximity to the proposed marine SI works.

As discussed above, given the nature of the estuary environment which supports relatively large quantities of suspended sediments and supports significant sediment transport through natural processes, in addition to the lack of predicted impacts upon fish populations generally, it is considered that there is no potential for likely significant sedimentation effects on either the QI species common bottlenose dolphin or upon wintering or breeding SCI bird species associated with the River Shannon and River Fergus Estuaries SPA.

No sedimentation effects to any further, more distantly situated European sites, are predicted to arise as a result of the proposed works.

On the basis of the above information it is considered that sedimentation effects associated with the proposed SI works would not have potential to give rise to likely significant effects upon any European

Site. Likely significant effects are excluded at the screening stage. This conclusion is drawn in the absence of the application of mitigation measures.

4.4.2.2 Pollution Incidents

There is a risk involved with any activity involving the use of machinery within the marine environment that a pollution incident might arise and result in spills or leaks of polluting substances into the water. There is potential for the works required, inclusive of the movement of a jack-up barge and associated tug and workboat, to give rise to pollution events from discharges of hydrocarbon fuels, oil-based lubricants and other chemicals. It is noted however that risks are extremely minimal, typical of the movement of any motor-operated vessel, as occurs continually within the harbour environment.

It is considered that given the nature of the proposals, which are small in scale, will not involve the use of large volumes of hydrocarbon fuels or other chemicals, that any potential pollution incidents potentially arising as a result of the proposed development will be very minor.

Significant mixing of seawater occurs within the Shannon Estuary with freshwater flowing in from the surrounding river catchments. The mixing of any polluting materials that escape to the marine environment as a result of the proposed works is further aided by the tidal currents, wind and wave climate which transport and continue to mix the seawater and freshwater (and any polluting substances) both into and out of the Shannon Estuary, and help it disperse widely and dilute to much lower concentrations to the point where it cannot be detected above background levels. On this basis any potential minor inputs arising as a result of the proposed works are highly likely to be undetectable beyond the immediate vicinity of the proposed works. It is considered likely therefore that any potential spills will be slowly dispersed into the wider estuary or biodegrade or settle within proximity to the works location.

The site of the proposed SI works will take place within areas which support Annex I habitats within the Lower River Shannon SAC, as detailed above, and intertidal wetlands which are a qualifying feature of the River Shannon and River Fergus Estuaries SPA.

An accidental pollution spill associated with the proposed marine SI works would not likely sufficiently dissipate prior to interacting with Annex I habitats within the Lower River Shannon SAC, namely reefs, mudflats and sandflats and estuaries to be able to exclude likely significant effects. Furthermore wetland habitats forming qualifying features of the River Shannon and River Fergus Estuaries SPA may be similarly affected. LSEs cannot therefore be excluded at the screening stage.

No LSEs to any further European sites considered within this assessment through impacts arising through pollution incidents will occur.

It is considered therefore that likely significant pollution effects upon the Lower River Shannon SAC and the River Shannon and River Fergus SPA cannot be excluded at the screening stage, in the absence of mitigation measures.

4.4.3 Underwater Noise and Disturbance

As described in Section 3, some aspects of the proposed SI works will require activities in the marine environment including activities producing underwater noise, including:

- Movement of a single work boat, tug and jack-up barge within the estuary to facilitate proposed works.
- Undertaking of boreholes incorporating a cable percussive drilling method through soft overburden and a rotary drilling method through underlying bedrock where required.

These activities carry a very small inherent risk of noise induced effects upon some marine species as a result of underwater acoustic energy being released into the marine environment. The purpose of the screening assessment is to determine whether or not such risks can be excluded.

Underwater noise is not a persistent effect, and once the noise source ceases noise levels drop very quickly to pre-existing levels. The natural underwater soundscape of the Shannon Estuary is not silent - biological sounds from fish and marine mammals are mixed with sounds from waves and surface noise; current flow and turbulence; rain and wind/storm noise; and noise from shipping and leisure craft activities. The ambient noise levels in coastal and inshore water, bays and harbours are subject to huge variation.

Lower River Shannon SAC is designated for the supported population of common bottlenose dolphin. No other European site within 20km of Foynes Island or its surrounds is designated for a species of marine mammal.

Proposed marine SI works will take place in close proximity to the Shannon Foynes Port, which supports regular marine traffic generating significant underwater noise. It is considered that the proposed borehole drilling works, in particular, will have limited potential to give rise to underwater noise effects in addition to background noise levels and those associated with the operation of Shannon Foynes Port. The area around Foynes Island is not identified in Map 16 of the Lower River Shannon SAC Conservation Objectives document as a 'critical area' for bottlenose dolphin, but nonetheless, elevated levels of man-made noise will occur throughout the works.

MacGillivray et al. (2014) showed that low-frequency sources such as sub-bottom profilers were the most audible sources to large baleen whales. Mid-frequency sources (fisheries, communication, and hydrographic systems) were the most audible sources to odontocetes at ranges below 3km, but low-frequency sources began to dominate between 3 and 10 km. Low- and mid-frequency systems have similar estimated audibility for seals due to their broad hearing range. For all species, modelled sensation levels are lowest for the high-frequency sources (side-scan and multibeam), which operate at the upper limits of the audible spectrum. The estimated zone of audibility for all species is largest for the low-frequency sources (sub-bottom profiler), which propagate over longer distances relative to the rapidly attenuating high frequencies. Thus bottlenose dolphins if very close to the vessel during site investigations may lead to disturbance and at worse auditory injury through temporary threshold shift (TTS).

In the absence of further information it is considered that the proposed marine SI works have potential to give rise to likely significant adverse impacts to common bottlenose dolphin populations of the Lower River Shannon SAC through underwater noise and vibrational disturbance.

It is understood that QI fish species, including sea lamprey, brook lamprey and river lamprey are, at several stages in their life cycle, vulnerable to the effects of underwater noise and vibration. While adult salmon are not particularly sensitive to relatively low intensity underwater noise (Harding et al. 2016)[1] their larval stages are more vulnerable and particularly sensitive to underwater vibration. On a precautionary basis it is assumed that lamprey have similar sensitivity to underwater noise and vibration as salmon, however little data is available.

The proposed works will take place at a significant distance downstream of any spawning habitat for QI fish species within the SAC and any potential underwater noise or vibrational effects predicted will only have potential to interact with juvenile or adult fish which are not recorded to be particularly sensitive to such effects. It is considered therefore that underwater noise and vibration would not have potential to give rise to likely significant adverse effects upon QI fish species of the Lower River Shannon SAC.

Given the nature of the works, which will take place during daylight hours and within the marine environment, it is not considered that there would be any potential for likely significant adverse effects

[1] Harding, H., Radford, A.N. & Simpson, S.D. (2016) The impact of pile driving playback on the behaviour and physiology of Atlantic salmon. Marine and Fisheries. 21st March 2016.

to otter populations within the SAC given their largely nocturnal habit and in the context of existing levels of disturbance at Shannon Foynes Port.

No other qualifying interests of this SAC or any other European sites, including bird populations within the River Shannon and River Fergus Estuaries SPA are considered to be sensitive to underwater noise and vibrational disturbance effects arising as a result of the proposed SI works.

It is considered therefore that the proposed marine SI works will potentially give rise to likely significant underwater noise and vibrational effects upon the Lower River Shannon SAC in the absence of mitigation measures.

4.4.4 Aerial Noise and Visual Disturbance

Mobile species that live above the water line can also be vulnerable to aerial noise and visual triggers of disturbance.

Given the aquatic nature of the vast majority of Annex II QI species for which the Lower River Shannon SAC is designated it is considered that only otter is vulnerable to the effects of aerial noise and visual disturbance.

It is noted that temporary disturbance to foraging adult otters would be unlikely to give rise to a likely significant adverse effect as individuals are likely to simply move on to adjacent undisturbed foraging habitat if they were present when a noise producing activity commenced. As the species is largely nocturnal, daytime disturbance to foraging otter is unlikely to occur as a result of the proposed works. Disturbance to this species is more critical is where it arises in close proximity to otters with young, particularly disturbance to natal holts or dens, where young are being raised. While resting places utilised by adult otters may be within areas requiring tolerance to disturbance, a key factor in the location of otter breeding sites and natal holts or dens is a lack of regular human disturbance (Liles, 2003)[2].

It is noted that the proposed borehole locations are universally situated in marine habitat in proximity to areas which are subject to relatively high levels of human disturbance associated with the ongoing operation of Shannon Foynes Port or recreational boating. These areas are therefore well away from any potential otter natal holts or dens, which are typically situated within terrestrial habitats well inland of the shore. As such it is considered highly unlikely that natal holts or dens would be present within proximity to proposed GI works locations.

No further SACs within the project's zone of influence would be potentially affected by aerial noise or visual disturbance arising as a result of the proposed works.

The River Shannon and River Fergus Estuaries SPA is designated for the supported populations of waders or waterbirds. These species are known to be susceptible to aerial noise or visual disturbance impacts including through abandonment of foraging habitats which, if disturbance is regular or prolonged, can give rise to a functional loss of habitat in the context of the SPA.

The proposed works will involve activities emitting aerial noise and associated with the movement of a single work boat, tug and jack-up rig, in proximity to Foynes Island and the Shannon Foynes Port. Areas of intertidal mud in proximity to the proposed works are known to support occasional populations of SCI species and function as foraging habitat for these species.

Likely significant effects as a result of aerial noise and visual disturbance effects associated with the proposed marine SI works, upon qualifying features of both the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA, cannot be excluded.

[2] Liles G (2003). Otter Breeding Sites. Conservation and Management. Conserving Natura 2000 Rivers Conservation Techniques Series No. 5. English Nature, Peterborough

4.5 In-Combination Effects

Article 6(3) of the Habitats Directive and Irish national law requires that in-combination effects with other plans or projects are considered. The significance of any identified combined effects of the proposed development and other past, present or reasonably foreseeable future plans or projects must also be evaluated. On this basis, a range of other port projects were considered in terms of their potential to have in-combination effects with the proposed works. Those plans and projects include:

- Capacity Extension Project at Shannon Foynes
- Various permissions and applications within the Shannon Foynes Port Estate.

4.5.1 Capacity Extension at Foynes Port

A project for capacity extension at Foynes Port (file number: 18301561) to facilitate capacity extension at Shannon Foynes Port. This capacity extension has been granted permission and is under construction. Capacity is to be provided in two interrelated ways – increased capacity of the quay wall, and, increased capacity of supporting landside storage facilities and logistics. The project includes two specific elements of development and operational activities as follows:

- Jetty Extension (the joining of the existing 'West Quay' and the 'East Jetty'), and;
- Durnish land development (to provide for increased port related storage and port-centric logistics)

The proposed development seeks to provide for Port Capacity Extension that will consist of the following:

1. M**odifications to the existing jetties and quays to include:** connection of the existing West Quay to the existing East Jetty for the purpose of extending the length of the existing quay to facilitate the mooring of vessels and Port related operations. Development works consist of; (i) Construction of an open piled jetty structure with suspended 116.5 metre concrete deck connecting the West Quay to the East Jetty; (ii) quayside furniture including quay fenders, mooring bollards, safety ladders, toe rail, and lighting columns, (iii) construction and remedial works to the both existing West Quay and East Jetty ends to facilitate structural 'tie-in' of the proposed new jetty structure, (iv) removal of the existing small craft landing pontoon and walkway from its current position affixed to the shore between the West Quay and the East Jetty, and provision of a new small craft landing pontoon and walkway affixed to the western side of the West Quay wall, and, (v) all associated site development works; and

2. **Phased Expansion of the Port Estate** on 33.95 hectares of land immediately adjacent to the east of the existing port estate to provide serviced industrial land, and, to accommodate marine related industry, port centric logistics and associated infrastructure that will be provided in accordance with a development framework programme prepared for the overall 'expansion' area and which is lodged with the planning application. The development includes:

   i. site development and infrastructure works to the entire expansion lands on a phased basis including (a) raising of ground levels with fill material to a typical height of +4.44m OD Malin; (b) provision of all associated services including storm water infrastructure and modification to the existing OPW drainage attenuation system; (c) provision of 2.4m high perimeter fencing, (d) landscaping berms and treatments, and (e) all associated site development works; all to be delivered on a phased basis; and

ii. Implementation and use of 'Phase 1' of port expansion works including: (a) modification and realignment to part of the existing port estate access road including provision of new roundabout and junction arrangements on that road, and associated lighting, and storm water drainage; (b) provision of new internal Port access road (with associated footpath and combined cycle path) including the provision of bridge structures to facilitate access across existing drainage channels; (c) construction of three covered industrial type warehouse units (with typical maximum ridge height of 15.1m above raised ground level) with associated external storage, parking and circulation areas; (d) the provision of separate dedicated uncovered 'open' storage area/ container storage area and associated circulation and service area (with maximum container stacking height of 8m if/when container storage required); (e) provision of Klargester BE model (or similar) package foul water treatment system with polishing filter and discharge to ground to serve the Phase 1a expansion area; (f) modifications to existing 'Foynes Engineering' industrial building which involves the removal of the 'lean-to' structure affixed to the main building and remedial building and site development works; (g) provision of an ESB electrical substation; (h) provision of lighting columns within the 'Phase 1' expansion area; (i) provision of a new security kiosk and access control barrier on the existing Port access road; (j) provision of noise attenuation measures along parts of the southern and western boundary of 'Phase 1' expansion area; (k) provision of a 'bus-stop' on the existing Port access road; (l) landscaping; and (m) all associated site development works.

This project was subject to Appropriate Assessment as part of the consenting process in 2018. This assessment concluded that subject to the implementation of a range of mitigation measures, including those intended to reduce the risk of pollution incidents both at construction and operational stages and underwater noise and vibration effects at construction phase.

If noise producing activities in the marine environment were to occur concurrently for the Capacity Expansion project and the proposed site investigation works, there is a possibility that cumulative underwater noise effects could occur on the Annex II marine QI species that occur in the Estuary. If activities potentially resulting in significant triggers of visual disturbance were to occur concurrently for the Capacity Expansion project and the proposed site investigation works, there is a possibility that cumulative disturbance effects could occur on the non-breeding SCI species of the SPA that occur in the Estuary. If accidental pollution events in the marine environment or were to occur concurrently for the Capacity Expansion project and the proposed site investigation works, there is a possibility that cumulative water quality effects could occur on the Annex I marine QI habitats that occur in the Estuary. Likely significant in-combination effects cannot be excluded.

4.5.2 Shannon Foynes Port Developments

An application (File number: 2360011) was submitted in January 2023 and has yet to be determined. Proposals include the construction of three covered industrial type warehouse units with associated external storage, parking and circulation areas, upgrade of existing site services and all ancillary works associated with the site development.

This application was subject to appropriate assessment as part of the submissions. 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. On this basis it is considered that the proposed development would not have potential to act in-combination with the proposed development.

An application (File number: 22742) was submitted in July 2022 for construction of seven covered industrial type warehouse units (with typical maximum ridge height of 14m above raised ground level)

with associated external storage, parking and circulation areas; upgrade of existing site services and all ancillary works associated with the site development. This application is for a 10-year permission. The application has yet to be determined.

While the application has not been supported by a Screening for Appropriate Assessment document or Natura Impact Statement, it is noted that the proposed development lies well away from the Shannon Estuary and the associated designated sites and is separated from them by existing port development. As such it is considered unlikely that this proposed development would have potential to act in-combination with the proposed marine SI works.

While various further applications have been submitted for development within Shannon Foynes Port, these are generally older and the construction to which they relate has already occurred. As such they do not have potential to act in combination with the proposed development.

4.5.3 Clarus Offshore Wind Farm

Clarus Offshore Wind Farm Limited is investigating the feasibility of developing an offshore wind farm off the west coast of Ireland. Clarus Offshore Wind Farm Limited intend to carry out the proposed site investigations investigate potential export cable corridors and landfall areas, and to assess the associated seabed.

The developer has sought a foreshore license application for these site investigation works. The area in which the proposed Clarus SI works are located includes a large proportion of the mouth of the Shannon including areas of the estuary terminating at Tarbert Island, all lying approximately 17km from the proposed Foynes marine SI works.

The foreshore license application has been supported by a Supporting Information for Screening for Appropriate Assessment and Natura Impact Statement. This report sets out that the SI works proposed for the Clarus project were anticipated to give rise to likely significant effects upon Annex I habitat: reef, and Annex II species: bottlenose dolphin, of the Lower River Shannon SAC in addition to further qualifying interests of additional European sites not relevant to the proposed Foynes marine SI works.

Subject to the implementation of mitigation in connection with these proposed site investigations including the use of marine mammal observers (MMO) and the avoidance of areas of reef habitat within the Lower River Shannon SAC it has been concluded that these works will not give rise to an adverse impact upon the integrity of the SAC. As such it is not anticipated that this proposal will have potential to act in-combination with the proposed Foynes marine SI works.

4.5.4 Illen Offshore Array

Illen Array Ltd. is proposing to develop an offshore wind farm at a site off the Kerry and Clare coasts. The proposed site will be developed using fixed and floating foundation wind turbine technologies.

Ilen Array Ltd. is seeking to undertake a variety of marine surveys at the proposed site in order to inform the specific location, design and layout of the proposed offshore wind farm and export cable route to shore. The surveys will include geophysical, geotechnical, environmental and metocean campaigns.

SI works associated with the foreshore license works will take place within areas at least 19km from the proposed Foynes marine SI area. No information on appropriate assessment is currently publicly available in respect of the foreshore license application.

It is anticipated that these works will be similar to the above Clarus Offshore Wind Farm in respect of its potential to give rise to likely significant effects upon Annex I marine habitats and Annex II species bottlenose dolphin associated with the Lower River Shannon SAC. However as no information is currently available on the incorporation of mitigation measures in respect of the proposed SI works it is assumed that these works will have potential to give rise to likely significant effects upon the Lower River Shannon SAC and as such in the absence of mitigation measures would have potential to act in-combination with the proposed Foynes marine SI works.

4.5.5 Mainstream Renewable Power Ltd.

Mainstream has identified potential search or investigation areas which are based on available data and minimise potential impacts to a number of key stakeholders.

The cable corridor and the array investigation areas are search areas in which surveys will be carried out to determine where infrastructure could be located. The Foreshore Licence Application Area is located off the west coast of County Kerry and County Clare approximately 17km at its closest point from the proposed Foynes marine SI area.

As per the Illen Offshore Array, no supporting information in relation to appropriate assessment has been submitted in support of the foreshore license for the proposed site investigation works connected with this project.

It is anticipated that these works will be similar to the above Clarus Offshore Wind Farm in respect of its potential to give rise to likely significant effects upon Annex I marine habitats and Annex II species bottlenose dolphin associated with the Lower River Shannon SAC. However as no information is currently available on the incorporation of mitigation measures in respect of the proposed SI works it is assumed that these works will have potential to give rise to likely significant effects upon the Lower River Shannon SAC and as such in the absence of mitigation measures would have potential to act in-combination with the proposed Foynes marine SI works.

4.5.6 Moneypoint Offshore Wind

Plans to develop offshore wind farms around the coast of Ireland in support of national and European targets for renewable electricity generation and de-carbonisation of our society.

Comprised of two projects, namely Moneypoint Offshore One Wind and Moneypoint Offshore Two which are both proposed as floating offshore wind projects. Moneypoint Offshore One is located to the west of County Clare and County Kerry and at least 22km from the proposed Foynes marine SI works. This Foreshore licence application relates to proposed Site Investigation (SI) works only.

As per the Illen Offshore Array, no supporting information in relation to appropriate assessment has been submitted in support of the foreshore license for the proposed site investigation works connected with this project.

It is anticipated that these works will be similar to the above Clarus Offshore Wind Farm in respect of its potential to give rise to likely significant effects upon Annex I marine habitats and Annex II species bottlenose dolphin associated with the Lower River Shannon SAC. However as no information is currently available on the incorporation of mitigation measures in respect of the proposed SI works it is assumed that these works will have potential to give rise to likely significant effects upon the Lower River Shannon SAC and as such in the absence of mitigation measures would have potential to act in-combination with the proposed Foynes marine SI works.

4.5.7 Rian Offshore Array Ltd.

The overall Rian Offshore Array Project relates to an offshore floating wind farm located which will be located off the west coast of Ireland, predominantly off the coast of north Kerry and county Clare with the closest aspect fo the proposals taking place at least 17km from the proposed Foynes marine SI works.

Rian Offshore Array will take a phased approach to development which incorporates two development phases:

- Phase 1 – Assessment of the Foreshore Investigatory Area, for the survey works investigating cable routing options
- Phase 2 – A further development site is proposed but details were not included in the foreshore licence application

As per the Illen Offshore Array, no supporting information in relation to appropriate assessment has been submitted in support of the foreshore license for the proposed site investigation works connected with this project.

It is anticipated that these works will be similar to the above Clarus Offshore Wind Farm in respect of its potential to give rise to likely significant effects upon Annex I marine habitats and Annex II species bottlenose dolphin associated with the Lower River Shannon SAC. However as no information is currently available on the incorporation of mitigation measures in respect of the proposed SI works it is assumed that these works will have potential to give rise to likely significant effects upon the Lower River Shannon SAC and as such in the absence of mitigation measures would have potential to act in-combination with the proposed Foynes marine SI works.

4.5.8 Moneypoint Hub Project

Marine SI is proposed as part of the overall Site Investigations in both the terrestrial and marine environment at the ESB facility at Moneypoint in order to inform the future deverlopment of the site as an offshore floating wind construction and deployment facility.

This proposal has been supported by documents relevant to appropriate assesment 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 Foynes marine SI works would have no potential to act in-combination with this project.

4.5.9 Shannon Technology and Energy Park

This development is for a site investigations associated with a proposed power plant and LNG terminal located at least 22km from the proposed Foynes marine SI works area.

This proposal has been accompanied by a Natura Impact Statement which identified the potential for likley significant effects upon the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA.

Subject to the implementation of a range of mitigation measures it is concluded that this proposal witll not give rise to any adverse effects upon the integrity of any European sites and as such willl not have potential to give rise to any in-combination effects alonside the proposed Foynes marine SI works.

4.5.10 Eirgrid Cross Shannon 400kV Electricity Cable

This development involves the laying of 400 kV submarine cables across the Lower Shannon Estuary between the Moneypoint 400 kV Electricity Substation in the townland of Carrowdotia South County Clare and Kilpaddoge 220/110 kV Electricity Substation in the townland of Kilpaddoge County Kerry. The proposal is located 19km from the closest aspect of the proposed Foynes marine SI works area.

This project has been subject to appropriate assessment which identified the potential for likely significant effects upon the qualifying features of the Lower River Shannon SAC through pollution and underwater noise disturbance. Subject to the implementation of mitigation measures in respect of this project in relation to these potential effects, including the use of MMOs, no adverse impacts to the integrity of this or any other European sites.

On this basis it is considered highly likely that this project will have no potential to act in combination with the proposed Foynes marine SI works.

4.6 Summary of Screening Appraisal

Table 4.3 summarises the outcome of the screening exercise for each European site considered.

Table 4.3: Screening Summary for European sites considered

Site Code	Site Name	Can the possibility of Likely Significant Effects be excluded at the Screening Stage of assessment?			
		Habitat Loss	Water Quality and Habitat Deterioration	Underwater Noise and Disturbance	Aerial Noise and Visual Disturbance
IE002165	Lower River Shannon SAC	✗	✗	✗	✗
IE004077	River Shannon and River Fergus Estuaries SPA	✗	✗	✓	✗
IE000432	Barrigone SAC	✓	✓	✓	✓
IE004161	Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	✓	✓	✓	✓
IE002279	Askeaton Fen Complex SAC	✓	✓	✓	✓
IE000174	Curraghchase Woods SAC	✓	✓	✓	✓

5 NEXT STEPS

A screening exercise was completed in compliance with the relevant European Commission and national guidelines to determine whether or not LSEs on any European site could be discounted as a result of the construction or operation of the proposed development.

From the findings of the Screening exercise, the possibility of LSEs upon two of the European sites scoped into the appraisal cannot be excluded in the absence of further evaluation and analysis and quite likely the application of mitigation measures, as a result of the proposed project alone and in combination with the other projects considered.

- The possibility of likely significant **Habitat Loss** effects cannot be discounted for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA without further evaluation and analysis.
- The possibility of likely significant **Water Quality and Habitat Deterioration** effects cannot be discounted for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA without further evaluation and analysis.
- The possibility of likely significant **Underwater Noise and Disturbance** effects cannot be discounted for the Lower River Shannon SAC without further evaluation and analysis.
- The possibility of likely significant **Aerial Noise and Visual Disturbance** effects cannot be discounted for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA without further evaluation and analysis.

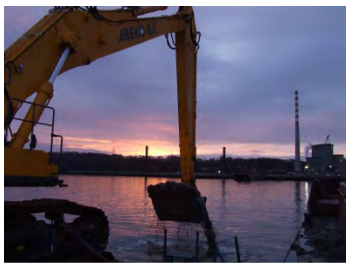
Having regard to the methodology employed and the findings of the screening stage exercise, it is concluded that an appropriate assessment of the implications of the proposed development on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA is required, in view of their conservation objectives and in combination with any other relevant plans or projects.

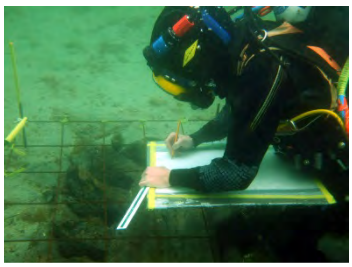
Appendix E– Archaeological Impact Assessment Foynes Island Deepwater Terminal Project Marine Site Investigation

Leading Maritime Archaeology

Archaeological Impact Assessment
Foynes Island Deepwater Terminal Project
Marine Site Investigation

Shannon Foynes Port
Foynes, Co. Limerick



Archaeological Impact Assessment
Foynes Island Deepwater Terminal Project
Marine Site Investigation

Shannon Foynes Port
Foynes, Co. Limerick

26th June 2023

Project Director **Rex Bangerter MA**

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LIST OF ABBREVIATIONS

ADCO	The Archaeological Diving Company Ltd
ACA	Architectural Conservation Area
AIA	Archaeological Impact Assessment
CD	Chart Datum
DCHG	Department of Culture, Heritage, and Gaeltacht Affairs
DAU	Development Applications Unit
E	Easting
N	Northing
EIS	Environmental Impact Statement
EIAR	Environmental Impact Assessment Report
HWM	High Water Mark
ITM	Irish Transverse Mercator
LCCC	Limerick City and County Council
LWM	Low Water Mark
NGR	National Grid Reference
NIAH	National Inventory of Architectural Heritage
OD	Ordnance Datum
OS	Ordnance Survey
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
SFPC	Shannon Foynes Port Company
SI	Site Investigation
SMR	Sites and Monuments Record
UAIA	Underwater Archaeological Impact Assessment
UAU	The Underwater Archaeology Unit

EXECUTIVE SUMMARY

The Archaeological Diving Company Ltd (ADCO) was appointed by RPS Ireland Ltd., on behalf of Shannon Foynes Port Company (SFPC), to undertake an Archaeological Assessment for advance Marine Site Investigation as part of the proposed Foynes Island Deepwater Terminal project.

Site investigation (SI) is required to inform preliminary design and facilitate environmental assessment in advance of Planning and Marine Area Consent applications for the project. The SI works are to comprise two (2) phases, gathering the required geotechnical data as follows:

- Area A, 133nr boreholes; 71nr during Phase 1 and 62nr during Phase 2.
- Area B, 30nr boreholes; 8nr during Phase 1 and 22nr during Phase 2.

It is understood that *cable percussive* drilling will be used for the recovery of firm to hard cohesive material from each of the marine boreholes. In the event that bedrock horizons are encountered, *rotary* drilling is to be employed. In addition, a number of surface grab samples will be gathered, comprising sixteen (16) samples across the Area A location and eight (8) along Area B.

The archaeological assessment, which is based on a desktop review of existing archival and published information, sets out the principal potential impacts and archaeological mitigation required for the Marine SI works.

The current assessment indicates the presence of a range of prehistoric and more recent archaeological sites within the wider area at Foynes. In addition, a number of fish weir/traps are present on the OS historic Maps for the areas under assessment (Cartographic Features F01-F04). Moreover, the existing archaeological record demonstrates a high potential for Foynes Island, with a list of known sites located upon the island. As a result, the surrounding foreshore/intertidal areas should be regarded as retaining a high potential.

A Marine Geophysical Survey of the foreshore boundary area is to take place prior to the proposed Marine site Investigation. The geophysical survey will cover the full area of the development footprint under water, where accessible, and be carried out to the specification provided in this report; ensuring that the data gathered is to a sufficient resolution/density for reliable archaeological interpretation to take place. Archaeological licensing/consent will be required for the marine geophysical survey. ADCO is to make the application submission to the DHLGH/ National Monuments Service (NMS) and will conduct the subsequent geophysical data review.

Archaeological survey and assessment of the terrestrial, intertidal, and underwater areas associated with proposed Foynes Island Deepwater Terminal project is also planned. This will include underwater inspection of any anomalies/features of archaeological interest arising from the Marine Geophysical Survey. This work will be carried out by ADCO.

In the event that features of archaeological/historic significance are encountered as part of the inspections, avoidance of those features will be recommended.

Archaeological Monitoring of the Marine Site Investigation is also recommended. The archaeological monitoring is to be carried out by experienced maritime personnel (licence eligible); monitoring all riverbed/ intertidal disturbances arising from the proposed SI works. No seabed disturbances are to take place unless an archaeologist is present to monitor the operation.

Recommendations are subject to the approval of the National Monuments Service (NMS) at the Department of Housing, Local Government, and Heritage (DHLGH).

LIST OF FIGURES

LIST OF PLATES

1.0 INTRODUCTION

The Archaeological Diving Company Ltd (ADCO) was appointed by RPS Group Ltd., on behalf of Shannon Foynes Port Company (SFPC), to undertake a desk-based archaeological impact assessment for Marine Site Investigation (SI) as part of the proposed Foynes Island Deepwater Terminal Project (Figure 1).

Shannon Foynes Port is a Tier 1 port that is situated on the southern shoreline of the Shannon Estuary, 38km west of Limerick City. The port specialises in bulk cargo with typical cargoes including energy products (liquid fuels, coal, etc.), agri-business inputs (feedstuff and fertilisers), recyclable materials, and green-energy components such as wind turbines. The proposed development project, which comprises the construction of a new terminal on the northwest side of Foynes Island, will provide significant additional capacity to existing port operations.

The Marine SI is required to inform preliminary design and facilitate environmental assessment in advance of Planning and MAC applications for the terminal project. The SI works are to comprise the gathering of the geotechnical data from the following:

- 133nr boreholes and 16nr surface grab samples at Area A and
- 30nr boreholes and 8nr surface grab samples at Area B.

The work will be undertaken out in two (2) phases; with seventy one (79) boreholes gathered as part of Phase 1, and eighty-four (84) boreholes as part of Phase 2:

- **Phase 1 -** 71 nr at Area A location and 8nr along Area B location.
- **Phase 2 -** 62 nr at the Area A location and 22nr along Area B location.

The archaeological assessment, which is based on a desktop review of existing archival and published information, addresses the known and potential archaeological environment; assesses the actual and proposed impacts on that environment from the SI works programme; and makes recommendations to resolve any further archaeological requirements prior to the SI works programme commencing.

2.0 MARINE SITE INVESTIGATION[1]

Marine Site Investigation is required as part of the proposed Foynes Island Deepwater Terminal project, (Figure 2).

The foreshore boundary surrounding the proposed Marine Site Investigations at Area A encompasses an area measuring 265,518m² (26.6ha). The boundary at Area B encompasses a further 137,057m² (13.7ha). Coordinates for the extent of each boundary are provided below in Table 1.

	Area A		**Area B**
Point	**Coordinate [ITM]**	**Point**	**Coordinate [ITM]**
1	523744.35E, 652776.92N	10	525307.36E, 652739.36N
2	523547.33E, 653015.81N	11	525966.53E, 652126.76N
3	524260.84E, 653579.69N	12	525820.52E, 652080.90N
4	524430.27E, 653365.31N	13	525327.93E, 652398.73N
5	524234.40E, 653136.31N	14	525339.40E, 652539.66N
6	523868.71E, 652879.87N	15	525887.77E, 652099.30N

Table 1: Foreshore Boundary areas identified for the proposed development.

The current scope of Marine SI works assumes the requirement for one hundred and sixty-three (163) marine boreholes (225mmØ), drilled to a maximum depth of between 20m-30m, within the identified foreshore boundary areas.[2] One hundred and thirty-three (133) of these are to be positioned within Area A (as detailed in Figure 2). Thirty (30) boreholes are to be located within Area B.

It is understood that *cable percussive* drilling will be used for the recovery of firm to hard cohesive material from each of the marine boreholes. In the event that bedrock horizons are encountered, *rotary* drilling is to be employed.

Plant identified for this work includes a works-platform (jack-up barge) and suitable tender vessel (tug/workboat). This barge-type is typically supported on four (4) spud-legs with a leg diameter of between 780mm and 1m.

[1] Non-technical summary of proposed SI works provided by RPS, Foynes Island, Site Investigation Proposal for Preliminary Design, Foynes Island Deepwater Terminal Project, Memorandum issued 15 December 2022.

[2] RPS notes that the number/depth of the required boreholes may be further refined following completion of the onsite surveys and in response to any design and environmental assessment requirements.

3.0 ASSESSMENT METHODOLGY

The desktop assessment includes a review of historic mapping, which can reveal the development of the landscape over time; an examination of existing archival information at the DHLGH (NMS) and the National Museum of Ireland (NMI) in relation to the known archaeological objects, features, and sites of archaeological and architectural interest; and a review of archaeological work conducted in the vicinity of the project area, from published and unpublished sources. This information combines to establish a baseline data source, the principal findings of which are presented Section 4.0 of this report.

3.1 Consultations

A desk study of cartographic and archival information has been completed. This includes, but is not limited to the following consultations:

- *Cartographic sources*, including Admiralty Charts, Ordnance Survey First and Second Edition maps, Geological mapping (GSI). Historic and current topographical maps represent very important sources that can reveal the progress of natural erosion and human development across a landscape/seascape over time. Such mapping in Ireland is metrically accurate from the mid-late nineteenth century.
- The *Irish Antiquities Division of the National Museum of Ireland* (NMI) retains an extensive archive of small finds and objects discovered across Ireland and reported to the Museum and its predecessors since the nineteenth century. It represents a critical resource for archaeological research, where registered objects are recorded by townland in the Topographical Files. For the present project, the following townlands were assessed: Foynes, Dunrish, Corgrig, and Ardaneer.
- *Department of Culture, Heritage and the Gaeltacht* (DCHG) *Sites and Monuments Record files*. The information, which is also filed according to townland, provides details relating to specific monuments and sites of archaeological importance that survive or whose site area is recorded. The record generally includes only sites that pre-date *c.* 1750 AD.
- *DCHG's Historic Shipwreck Inventory files* and *Places and Ports archive*. This information relates to the archives maintained by the National Monuments Section's Underwater Archaeology Unit for shipwreck and other maritime sites of archaeological interest. The information is located with reference to the nearest topographic locator, such as a town or headland, as well as site-specific grid coordinates where known.
- *National Inventory of Architectural Heritage* provides an online register of historic buildings and features/street furniture that retain architectural interest and is maintained by the DCHG's architectural section. The Inventory is organized by place and townland. The Inventory complements the archaeological inventories by including buildings and features that date from the eighteenth century and more recently.
- *Excavations Bulletin* is an annual published list of licensed archaeological intervention work conducted across Ireland. It is arranged by county and then by townland and is currently completed to 2011.
- Relevant published sources.
- Relevant unpublished sources.
- Online sources.

3.2 Legislation

The following legislation, standards and guidelines were considered and consulted for the purposes of the assessment:

- Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000 and the Local Government (Planning and Development) Act 2000;
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands;
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes, NRA;
- Guidelines on the information to be contained in Environmental Impact Statements, 2022, EPA;
- Heritage Act, 1995;
- National Monuments Acts, 1930-2004;
- Planning and Development (Strategic Infrastructure) Bill, 2006;
- Strategic Environmental Assessment (SEA) Pack, 2010 EPA;
- In the absence of a specific Code of Practice between the Marine Industry and the Minister of Housing, Local Government, and Heritage, the following Codes of Practice that exist between industry and the Minister were consulted: Bord Gáis Éireann (2002); Coillte (no date); EirGrid (2009); ESB Networks (2009), Irish Concrete Federation (2009), National Roads Authority (no date), Railway Procurement Agency (2007).

The following county and local development plans were considered and consulted for the purposes of this evaluation:

- Limerick Heritage Plan 2017-2030
- Limerick County Development Plan 2022-2028

Limitations

The current report is based solely on a desktop review/study, the assessment being carried out in advance of a planned suite of onsite archaeological assessments that are to take place pre-planning.[3]

3.3 Classification of Impacts

Impact/effect categories will typically have regard to those set out in the '*Guidelines on the information to be contained in Environmental Impact Statements', 2022*, EPA; 'Advice notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA; Strategic Environmental Assessment (SEA), 2010; and Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes, no date, National Roads Authority.

Impacts are generally categorised as either being a direct impact, an indirect impact or as having no predicted impact:

> **Direct impact** occurs when an item of archaeological or architectural heritage is located within the footprint of the proposed development and entails the removal of part, or all, of the monument or feature.
>
> **Indirect impact** may be caused where a feature or site of archaeological or architectural interest is located in close proximity of the proposed development.

[3] A series of archaeological assessments, including UAIA are to be carried out by ADCO, as part of the project EIAR.

No predicted impact occurs when the proposed development option does not adversely or positively affect an archaeological or architectural heritage site.

These impact categories are further assessed in terms of their quality i.e. positive, negative, neutral (or direct and indirect).

Negative Impact is a change that will detract from or permanently remove an archaeological or architectural monument from the landscape.

Neutral Impact is a change that does not affect the archaeological or architectural heritage.

Positive Impact is a change that improves or enhances the setting of an archaeological or architectural monument.

A significance rating for these impacts is then given i.e. slight, moderate, significant or profound.

Profound applies where mitigation would be unlikely to remove adverse effects. This is reserved for adverse, negative effects only. These effects arise where an archaeological or architectural site is completely and irreversibly destroyed by a proposed development.

Significant is an impact that, by its magnitude, duration or intensity alters an important aspect of the environment. An impact like this would be where the part of a site would be permanently impacted upon leading to a loss of character, integrity and data about the archaeological or architectural feature/site.

Moderate is a moderate direct impact that arises where a change to the site is proposed which, though noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological or architectural feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.

Slight is an impact that causes changes in the character of the environment that are not significant or profound and do not directly impact or affect an archaeological or architectural feature or monument.

Imperceptible is an impact capable of measurement but without noticeable consequences.

In addition, the duration of Impacts is assessed and has been sub-divided into the following categories:

- **Temporary Impact**, where an Impact lasts for one year or less
- **Short-term Impacts**, where an Impact lasts one to seven years
- **Medium-term Impact**, where an Impact lasts seven to fifteen years
- **Long-term Impact**, where an Impact lasts fifteen to sixty years.
- **Permanent Impact**, where an Impact lasts over sixty years.

4.0 RECEIVING ENVIRONMENT

4.1 Shannon Estuary[4]

The Shannon estuary is the largest inlet located along the Irish coastline and constitutes an exposed inter-tidal zone around 200km in length (combined length of both sides of the river). The estuary is part of a dynamic landscape that includes raised bogland, freshwater fens, salt marshes and intertidal mudflats.

Estuarine environments are sensitive to sea-level change and large areas of prehistoric foreshore have been submerged by relatively small fluctuations in that level. The inter-tidal environment provides for an extremely rich archaeological holding content and archaeological/palaeo-environmental evidence of Mesolithic, Neolithic, Bronze Age and post-medieval date has been recovered from the Shannon. Moreover, large sections of the estuary provide suitable environmental conditions for the preservation of archaeological material along its intertidal zone, where deep deposits of estuarine mud provide an anaerobic environment within which archaeological material is preserved. Indeed, areas of submerged Neolithic forest have been identified, buried deep within the estuarine clays.

Research conducted in the 1990s highlighted the archaeological importance of the Shannon estuary since earliest times.[5] The work conducted by the Discovery Programme focused attention upon the role that the estuary played in providing economic potential in terms of coastal exploitation for fishing and communications since the later Mesolithic period, before people exploited the landscape directly for agrarian production. The study area was concentrated on the intertidal mudflats on the Fergus and Meelick rivers, and around Carrigdirty, Co. Limerick (upriver from the present survey area).

While the distribution of known medieval and early modern/nineteenth-century fortifications along the estuary was well known, the research work brought attention to the archaeological potential of the larger estuary area; highlighting as-yet undocumented foreshore areas and their potential retain relict fish weirs and old piers as intertidal features that can hold significant and early phases of use.

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[4] Where relevant, information has been included from ADCO's previous assessments at Foynes, these include Rex Bangerter and Niall Brady, 'Archaeological and Architectural Assessment, Foynes, Co. Limerick, Shannon Foynes Port Land Reclamation', ADCO Ltd; unpublished report 2010 and EIS Chapter 13, *Archaeology and Cultural Heritage, Shannon Foynes Port Land Reclamation project* and Rex Bangerter, 'Archaeological Impact Assessment, Capacity Extension and Harbour Development Project, Shannon Foynes Port, Foynes, Co. Limerick', ADCO Ltd; unpublished report 2018 and EIS Chapter 14, *Archaeology and Cultural Heritage, Capacity Extension at Shannon Foynes.*

[5] Aidan O'Sullivan, *Foragers, Farmers and Fishers in a Coastal Landscape: an Intertidal Archaeological Survey of the Shannon Estuary*, Discovery Programme Monograph 5 (Dublin, 2001).

In the vicinity of Foynes Harbour, the estuary measures 3.9km in width (max.). Foynes Island, located to the south, and Robertstown River, to the east, has resulted in the creation of a broad channel (*c.* 530m width) that flows past the southern and western extents of the island. The area between Aughinish and Durnish Point is characterised by extensive intertidal mud-flats, with an intertidal exposure of up to 900m, to the east of the Roberstown River. Between the Port of Foynes and Foynes Island, the opposing intertidal zones measures between *c.* 52m and *c.* 121m in exposure.

4.2 Foynes Port/ Island

Foynes lies on the south side of the Shannon estuary, west of Aughinish. The presence of Foynes Island (*Oileán Fainge*), some 330m to the North presents a wide channel and a most suitable anchorage with protection from the winds, but with a strong ebb flow. Indeed an entry in Lewis's *Topographic Dictionary of Ireland* (1837) observes that:

> This place *[Foynes Island]* has been recommended by Capt. Mudge, the Government engineer, as affording extensive and secure anchorage for shipping, and consequently as a proper situation for the construction of docks and quays; at present it is seldom resorted to by mariners, but the steamers plying between Limerick and Kilrush call off the island to take up passengers. There was formerly a battery of *24*-guns on the island, erected for the protection of the shipping trade of the river. On the south side is a handsome marine villa, the summer residence of the Earl of Dunraven; and there are several neat cottage residences in different parts of the island.[6]

The suitability of establishing a harbour at Foynes was assessed by F. Burgoynes, Harry D. Jones, and Richard Griffith, as part of the 1837 Commission for the Improvement of the River Shannon. Following the commission's findings, harbour works began in 1846 with the construction of a masonry quay and associated breakwater. By 1885, an act of parliament initiated the transfer of ownership of Foynes Harbour from the Commissioners of Public Works to a newly established board of trustees; the Foynes Harbour Trustees. Transfer was completed in 1890 and several infrastructural improvements to the harbour area followed. A new timber jetty was constructed (sometime before 1898), extending from the terminus of the masonry quay, and concrete-built spur was added in 1915; positioned parallel to the original quayside. Further development took place in 1933 with the construction of a new jetty, designed to cater for larger vessels, up to 8,000 tons. Around this time the port also became the European base for a transatlantic flying-boat service, which operated out of Foynes for the following decade. The existing East Jetty was established in 1968 and subsequently extended on its west side in 1984. A photograph from the 1960s provides an aerial view of Foynes subsequent to the construction of an oil terminal, an ore unloading plant, and the aforementioned East Jetty (Plate 1). It also, shows sizeable reclamation of the foreshore

[6] Samuel Lewis, *A topographic Dictionary of Ireland comprising the several Counties, Cities, Boroughs, Corporate, Market, and Post Towns with Historical and Statistical Descriptions* (London, 1837).

undertaken as part of the above developments, approximately 153m (max.) north-south x 800m east-west area being reclaimed. The original shoreline is denoted by the aforementioned floodwater embankments which are still *in situ*.

Foynes Island comprises a small, oval-shaped, landmass located to the north of Shannon Foynes Port. The island measures 1.4km length (northwest-northeast) and 1.2km in width (east-west). It is composed of carboniferous siltstone and shale deposits, the strata from which have formed outcrops of shelving bedrock along its shoreline, predominantly to the north and south. Low-lying cliffs delineate the east and western shorelines. Glacial till (boulder clay) is exposed along the upper foreshore, giving way to overlying deposits of estuarine silt, located towards the low water mark.

A disused Oil Jetty projects *c.* 200m from the north shoreline, at a point 268m east of Battery Point; this structure being in use up until late 1970's. A 21m-long open pile boat jetty is also located on the southwest side of the island, immediately to the south of Barneen Point. This structure facilitates local access to the island (residents of Barneen House and Monare House), replacing an earlier, nineteenth-century, masonry quay that is located on the upper foreshore at a point *c.* 58m to the east.

The island is subdivided into a patch-work of fields that retain much of the layout as depicted on the OS historic mapping, although some are now less subdivided. These were predominantly used for rough-pasture until the mid-1950s. In the 1990s, approximately 50% of the available land was subject to afforestation (mixed woodland species); approximately 10% having already been under native woodland.

A range of archaeological sites are identified on Foynes Island (Appendix 1). The presence of six (6) *fualchta fiadha* or spreads of burned stone material, indicate a distinct prehistoric horizon of activity that is concentrated in the centre and along the north shore of the Island. These are a commonly occurring site and represent cooking and related activities, which are often associated with nearby settlements but can also occur in isolation, suggesting the re-use of more general hunting or fishing sites. The clustering of *fulachta fiadha* on Foynes Island carries the attention westwards along the estuary for prehistoric activity that has been identified on the tidal mudflats to the east at Carrigdirty, and to the north along the Fergus Estuary.[7] There is however an absence of known archaeological sites at Foynes itself. This is a low-lying area on which tidal mudflats developed to the west of the Robertstown River and Aughinish, which lie *c.* 150m east of the present-day Port. In many respects, the landscape

[7] Aidan O'Sullivan, *Foragers, farmers and fishers in a coastal landscape: an Intertidal Archaeological Survey of the Shannon Estuary'*, Discovery Programme Monograph 5., (Dublin 2002), pp55, 93

presents an ideal environment for early prehistoric activity similar to that which has been identified further east, focused on the exploitation of marine resources through the use of fishtraps and other shore-based activities. However, the establishment of the pier and later port will have removed and/or buried such remains.

The Napoleonic era battery on Foynes Island reflects the degree to which the landing place at Foynes was regarded with some importance in the past. The battery site (LI 010-001) was an earthwork construction that held six 24-pound cannon and formed part of the wider network of defences along the estuary.[8] The battery was considered capable of commanding the full width of the river at this point, which is a mile wide from Battery Point across to the Co. Clare shore.

Today Foynes forms a linear settlement with the continuation of house-building along much of the N69 and new housing developments established on the south side of the conurbation. Shannon Foynes Port commands much of the shoreline, comprising a general-purpose terminal that caters for dry-bulk, break-bulk, liquid, and project cargoes. The port complex comprises of the West Quay, completed in 1999 (271m length), the East Jetty (295m length), associated warehousing, port services, and oil-dolphins located to the east of the site (Plate 2). Reclamation of the intertidal foreshore behind Berth 6, on the east side of the East Jetty, was competed in 2012 and reclamation of the intertidal foreshore behind Berth 5 is ongoing.

4.3 Cartographic Information

The earliest map that depicts the River Shannon area surrounding Foynes is from the Down Survey Mapping of 1656–58; *Barony of Connello* (Plate 3). While this map depicts Foyne's Island and the adjacent shoreline, no cartographic indicators of development within the area are shown. In contrast, the neighbouring *Parish of Loughill* is shown to contain a series of clearly defined field boundaries, along with a church, tower house, and number of dwelling houses that surround the settlement of '*Loughill'.* It is not until nineteenth century that a settlement of Foynes is established and any corresponding mapping produced. As such, it is the OS First (1844) and the subsequent OS 25-inch (1898) maps editions that are subject to discussion, with particular reference to the following cartographic areas:

- Foynes and its shoreline (Historic Harbour to Durnish Point).
- Foynes Island; north and south shoreline.

[8] Paul Kerrigan, *Castles and Fortifications in Ireland, 1485-1945* (Collins Press, Cork 1995), p. 211.

4.3.1 OS First Edition (1844) map; Figures 3-5

Foynes and adjoining shoreline

The OS First Edition map (1844) depicts Foynes village as a linear development of detached and semi-detached dwellings situated either side of a roadway (now part of the N69) which runs close to the upper foreshore on the south side of the river estuary (Figure 3). A '*Post Office*' and '*Police Barracks*' are depicted to the west of the settlement, and a '*National School'* is shown *c.* 200m to the southwest. A small quay structure, annotated '*Quay*', is shown on the upper foreshore, between the main street and the aforementioned post office; depicting the foreshore prior to the development of Foynes harbour in the late 1840s.

The inter-tidal zone adjacent to Foynes Village is depicted as a wide expense of estuarine mud-flats; forming an intertidal foreshore that extends between *c.* 121m and *c.* 350m in width. Flood embankments are located along the upper foreshore, placed to protect farmland to the southeast of Foynes and fields to the north of Durnish Td. Opposing flood embankments are also depicted along the extent of Robertstown River, delineating the High Water Mark within the townlands of Aughinish to the east and Durnish to the west.

A '*Weir*' is shown running roughly north-south from the Low Water Mark, located parallel (west) to a small river that has cut a channel through the inter-tidal zone (CF01) (Figures 3 and 5). This structure measures approximately 170m in length and has two (2) equidistant arms that protrude at right angles from the west side of the structure; measuring *c.* 25m in length. This tidal fish-trap represents a sizable endeavour and highlights the exploitation of the estuarine environment as a natural resource in the nineteenth century; being one of many such sites observed along the Shannon estuary.

A collection of small rectangular buildings is located to the north of Durnish Td, annotated '*Durnish Cottage'*. A narrow laneway, providing access to the cottage, transects scrubland to the west of the townland; running south to meet the main road into Foynes village. Another building is located approximately halfway along this access laneway, on its north side. The townland of Durnish is depicted as a collection of irregular-shaped fields and scrubland with frequent bedrock outcrops present; the scrubland comprising *c.* 40% of the townland area. A circular enclosure (LI 010-009) is located near the southern boundary of the Durnish townland.

Foynes Island; north and south shoreline

The foreshore on the north side of the island is depicted as a board inertial area that extends a distance of *c.* 1.1km between Leck Point, to the east, and Battery Point (annotated '*Site of Battery*') to the west; the battery (RMP LI010-001) being positioned at the apex of a broad promontory on the northwest side of the island. A trigonometrical point (triangulation station)

is also shown at this location, annotated number '*43*'. The uppermost part of the foreshore, for much of the shoreline, is shown as a shingle-type deposit (*c.* 25m width), below which intertidal mud-flats are present (ranging in width between *c.* 78m and *c.* 174m). To the east, bedrock extends in a northeast direction, with three bedrock spurs forming '*Leck Point'*. Another, smaller, spur of shelving bedrock is located *c.* 180m to the west of the aforementioned headland. A short distance (19m) to the east of this bedrock, a fish-weir/trap (annotated 'Weir') is present; depicted as a linear structure that extends from the upper foreshore, in a northwest direction, for a distance of *c.* 53m (CF02) (Figures 3-4).

An expanse of shingle is shown surrounding the northwest promontory, extending up to *c.* 100m before reaching the Low Water mark. This deposit is also shown to comprise much of the foreshore on the west side of Foynes Island.

The southern side of the island is similarly characterised by shelving bedrock, single deposits and expanses of inertial mud-flats (Figure 3). Across its southwestern extent, low-lying cliffs and shelving bedrock give way to a series of inlets and corresponding bedrock spurs. Two large residential structures, including a formal garden, are shown to occupy the land behind (annotated '*Foynes Ho.*'). The south-eastern part of the island is annotated '*Gammarel Point*', situated roughly opposite Durnish Point on the east side of Foynes (Figure 5). An area of shingle (*c.* 360m-long) is shown surrounding Gammerel Point, extending *c.* 60m from the upper foreshore to the Low Water mark. Moving northeast, a large expanse of inertial mud-flat (annotated '*Mud*'), extends *c.* 620m from the east side of the island. An additional section of intertidal shingle and mud is located immediately to the south of the greater intertidal expanse, forming a linear feature measuring *c.* 714m length (northeast-southwest) by c. 140m in width (northwest-southeast).

4.3.2 OS 25-inch Edition (1898) map; Figures 6-8

Foynes and adjoining shoreline

The OS 25-inch Edition Map (1898) depicts a much developed Foynes. Of particular note is the establishment of a harbour area to the northwest, completed in 1853 (Figure 6). This includes a *c.* 100m-long masonry quayside, delineating the east side of the harbour (orientated north-south), a dog-legged pier structure that extends from the quay's terminus, and the insertion of a *c.* 104m-long breakwater that extends eastward from the west side of the harbour. A small '*Slip'* is also positioned at the southwest corner of the inner the harbour. Development of the port, form the 1960's onward, greatly altered the shoreline depicted, significant development having extended between Foynes Rock and Durnish Point; as highlighted by the overlay of the modern shoreline upon OS 25-inch map (Figure 6; shoreline, present-day).

A railway line, constructed in 1858 to facilitate port activities, is also shown running along the Foynes shoreline. The railway terminates a short distance to the east of the harbour area, where a '*Terminus*' and '*Goods Shed*' are also depicted. A sizeable flood embankment, as noted on the First Edition Map, is visible running along the upper foreshore, to the left-hand side of the picture.

A '*Saw Mill*' and associated buildings are shown immediately to the south of Foynes Harbour, a number of these buildings survive today and are currently in use by SFPC. A hotel, annotated '*Monteagle Arms',* is situated immediately to the east of the aforementioned saw mill. The hotel was built in 1860, on land leased from the Monteagle Estate. In 1938 the Department of transport acquired the building and it became the headquarters for Aviation Ireland, later being taken-over as offices for the Foynes Port Company. Today it houses the Foynes Flying Boat and Maritime Museum.

The OS 25-inch map also depicts the development of Foynes village, the settlement having expanded eastwards with the addition of dwelling houses along its approach road. In addition, a '*Bank*', '*Court Ho.*', '*Smithy'* and chapel (annotated '*St. Senan's R.C. Chapel*') are now shown.

A staggered '*Salmon Weir*' is depicted transecting the intertidal foreshore off Durnish Point (CF03), *c.* 600m east of Foynes village and *c.* 350m west of Robertstown River (Figures 6 and 8). It is orientated north-northwest to south-southeast and measures *c.* 159m in overall length; the structure comprising of two distinct sections. The first section, located along the upper part of the intertidal zone, measures *c.* 102m length and the second, located along the lower part of the intertidal zone, measures *c.* 57m length.

In contrast, there is little development indicated for the townland of Durnish; the area continuing to comprise a series of irregular-shaped pasture fields and scrubland. However, a series of drainage ditches and an associated '*Sluice*' structure are shown, demonstrating attempts to improve the quality of this poorly-drained land. Durnish Cottage and Corgrig House (NIAH: 21829031) are also shown, as is the nearby enclosure site (RMP: LI 010-009). The most notable development within this area is the insertion of the Limerick-Foynes railway line, which transects the southern part of Durnish in an east-southeast to west-northwest direction.

<u>Foynes Island; north and south shoreline</u>

The north shoreline retains much of the cartographic character depicted on the OS 25-inch Edition map, comprising a rocky shoreline, giving way to shingle and intertidal mud-flats. Moreover, an overlay of the present-day shoreline upon this mapping indicates little change to

shoreline topography from that presented on the either of the historic map editions (Figure 7). The northwest promontory is now annotated '*Battery Point*' and the adjacent gun battery (RMP LI010-001) annotated '*Battery (Site of)*'. In addition, a *c.* 90m section of embankment if shown on the seaward side of the gun battery. The fish-weir/trap annotated '*Salmon Weir*' (Figure 7; CF02) is located close to the location of the fish-weir depicted on the OS First Edition map. However, the orientation (north-south) and length (66m) differ, suggesting that this feature may be replacement to that previously indicated. Another fish-trap (CF04) is also shown on the 25-inch map, positioned on the west side of the island (see Figure 3 for location).

The southern shoreline at Gammarel Point, as depicted on 25-inch map, largely corresponds to that of the present-day, with foreshore/intertidal areas being comparable in nature/extent (see Figure 3/Figure 8); the inclusion of a linear section of exposed bedrock (*c.* 136m-long) that runs eastward along the uppermost part of foreshore, being the only exception to this. However, the most noticeable cartographic change along the southern shore is the addition of '*Monare*' House and its grounds; a county house built in the 1850's for Sir Stephen Edward De Vere of Currgah Chase, Adare (Member of Parliament for Limerick 1854-59). A stone built quay (annotated '*Quay*') is also included, positioned on the upper foreshore at a location *c.* 100m east of Barneen Point*,* opposite to '*Barneen*' House (formerly annotated '*Foynes Ho.*'). In addition, a series of narrow trackways, providing access between the two residences and the aforementioned quay are now depicted.

4.4 Topographic Archive

The topographic archives held at the National Museum of Ireland contain lists of artefacts held at the museum or previously seen at the museum and returned to owner. The Museum's files present an accurate catalogue of objects reported to that institution from 1928. There is a computerised database of finds from the 1980s onwards. They are categorised by their location into county and further into townland, town, city, street or river where they come from. There are rarely any grid co-ordinates to precisely locate find-spots. The find-spots of artefacts can be an important indication of the archaeological potential of the related or surrounding area. The information is ordered according to townland. In assessing the information for Foynes Island, the following townlands were considered: Foynes Island; Durnish, Corgrig, and Ballynacragga North.

A single object is noted in the records of the National Museum of Ireland under these townlands. A long narrow axe-head made from silicified black mudstone, typical of the 'Clare Shales' of Cos. Clare and Limerick, and which outcrop at the east end of Foynes Island was recorded from the central area of Foynes Island. The axe head is 17.7cm long, 5cm wide at

its blade, and up to 2.3cm thick. It is in private possession and represents a typical tool for cutting wood during early prehistory.

4.5 Known Sites and Monuments

The Record of Monuments and Places (RMP) is a list of archaeological sites based on the Sites and Monuments Record (SMR) files, maintained by the National Monuments Section at the DHLGH. SMR entries include detailed descriptions of archaeological sites based on site visits and historic studies and associated mapping where available. The SMR focuses on sites that are pre-1700AD in date. While later buildings are not well represented in the archive, all structures that are more than 100 years old are considered as archaeological sites today.

Seven (7) RMP sites are listed for Foynes Island, although only two (2) are located in proximity to the areas under assessment (Table 2, Figures 3-4, Figure 7, and Figure 9). The listed sites range in date from the prehistoric to post medieval period and highlight the longevity of human activity within the area.

A full entry list of the RMP sites within the vicinity of Foynes/Foynes Island (2km radius) is provided in Appendix 1.

RMP Number	Location [NGR/Townland]	Site Type	Distance to nearest foreshore area
LI 010-001----	523904E, 652905N; Foynes Island	Battery, site of	40m east of the boundary for Marine SI across Area A location.
LI 010-009----	525978E, 651402N; Durnish Td.	Enclosure	706m south of boundary for Marine SI across Area B location.
LI 010-109----	524226E, 652963N; Foynes Island	Fulachta Fiadh, possible	102m south-southeast of the boundary for Marine SI across Area A location.
LI 010-110001-	524456E, 652790N; Foynes Island	Fulachta Fiadh	381m southeast of the boundary for Marine SI across Area A location.
LI 010-110002-	524509E, 652759N; Foynes Island	Fulachta Fiadh, possible	448m southeast of the boundary for Marine SI across Area A location.
LI 010-111----	524649E, 652739N; Foynes Island	Fulachta Fiadh, possible	563m southeast of the boundary for Marine SI across Area A location.
LI 010-112001-	524670E, 653296N; Foynes Island	Fulachta Fiadh	253m east-southeast of the boundary for Marine SI across Area A location.
LI 010-112002-	524662E, 653245N; Foynes Island	Fulachta Fiadh	265m east-southeast of the boundary for Marine SI across Area A location.

Table 2: Known sites and monuments listed in the RMP within a 2km radius of the areas under assessment.

4.6 Shipwreck Inventory

The Historic Shipwreck Inventory maintained by the DHLGH is a list of recorded instances of wrecking since 1750. The details provided describe the type of vessel, the journey it foundered on, and information on the ultimate plight of the vessel and its crew, where possible. In describing the wrecking event, the records will locate the incident in relation to the nearest headland or other topographic marker where known. This is not however a record of where the wreckage lies, since the historic records generally only deal with the vessel before it sunk. Such finer details emerge from other sources, such as fishermen's records of snag points and diver records of sites located underwater. These are included in the Inventory wherever possible but it is true to say that most entries lack this final level of data. While the Inventory provides a record of wrecking incidents since 1750, it does not claim to be a comprehensive record for earlier events, and therefore the medieval and prehistoric periods are not represented in this archive.

The shipwrecks recorded for the Shannon estuary have been examined.[9] Where it is possible to approximate the location of ship-wrecking events, one observes a fairly even distribution along both north and south shores of the estuary, with a particular concentration at Kilrush, no doubt because of the extensive fishing port that Kilrush represents. In assessing the pattern of wrecking at Foynes, the following topographical markers were noted: Durnish Point, Gammarel Point, Foynes Rock, Poultallin Point.

There are two (2) references to wrecking events at or close to Foynes. A sailing boat whose name was not recorded was reported as having wrecked 'near Foynes Island' on 12th August 1788. The boat was carrying three men form Limerick when it overturned in a squall. Two of the men drowned. The *Castleragget* was a turf-boat journeying from Limerick in October 1833 when she was hit by a brig near Foynes Island. Nine people died. A single known (physical) wreck is identified for the study area and comprises a metal wreck (W10603) located on the west shoreline of Foynes Island (Figure 3 and Figure 9).

4.7 National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is a county-by-county database that identifies, records, and evaluates the post-1700 architectural heritage of Ireland as an aid to the protection and conservation of the nations' built heritage. The NIAH surveys provide the basis for the recommendations of the Minister for the DHLGH to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

[9] Breen and Callaghan, *The Archaeology of Post-medieval Shipwrecks, Harbours and Lighthouses*, 2001, in 'Farmers, Forgers and Fishermen on the Shannon Estuary', Aiden O'Sullivan (Ed.), pp.233-251, RIA publication, 2001.

No sites are listed for Foyens Island, although the two (2) historic properties and the probable remains of an associated masonry quay, located on the south side the island, would most certainly warrant inclusion. A total of twenty-one (21) entries are located within the wider area that includes the townlands surrounding Foynes (see Figure 3 and Appendix 1). One (1) entry directly relates to the development of the port in the 1840s (Historic Harbour; NIAH 21829004), the rest relating to the development of the settlement of Foynes in the mid- to late nineteenth century.

4.8 Licensed Archaeological Work

The *excavations bulletin* provides annual published and online summary of accounts of archaeological excavations undertaken throughout Ireland.[10] Summaries may also be submitted for inter-tidal survey, underwater assessments, and the archaeological monitoring of marine/ riverine dredging works. The majority of the entries relate to development-led archaeological work. Appendix 1 lists the entries relating to the townlands surrounding Foynes, comprising: Aughinish Island, Aughinish West, Ballynacragga, Corgrig, Durnish, Leahys, and Foynes Harbour.

Eight (8) sites of archaeological significance are listed and include: a Bronze Age stone fort (entry: 1975-0025), a Medieval Tower House and Bawn (entry: 1974-0028), an Enclosure site (entry: 1996: 0232, RMP: LI010-014), an Early Christian Ringfort (entry: 2004-0975, RMP LI010:082), and a series of *Fulachta Fiadh* and associated burnt mounds that were encountered as part of archaeological investigations carried for the Bord Gáis Energy Pipeline to the West. These latter observations complement the series of burned stone spreads observed on Foynes Island and serve to highlight further the prehistoric dimension that exists along this wider shoreline. Two entries relate to archaeological monitoring that has taken place within the estuary at or close to Foynes, but in neither instance have materials of interest been observed. One entry (02E0469) refers to monitoring of backhoe dredging associated with the laying of a section of gas pipeline across the River Shannon between Leahys townland, Co. Limerick, and Shanakea townland, Co. Clare. The second entry (02E1767) relates to archaeological monitoring of maintenance dredging works at Foynes Port and is the first reference to licensed archaeological work occurring close to the areas under assessment. This project noted a series of previous dredging projects, including capital dredging within the port area but these projects took place before the need to archaeologically monitor such work, and no materials of archaeological significance were reported.

In 2010, ADCO was appointed by RPS Ireland Ltd., on behalf of the Shannon Foynes Port Company Ltd (SFPC), to undertake an archaeological and architectural assessment as an

[10] Isabel Bennett (ed.) Excavations Bulletin: Summary Accounts of Archaeological Excavations in Ireland (various dates; also online at www.excavations.ie).

Environmental Impact Assessment (EIA) for the Cultural Heritage and Architectural Heritage section of the project Environmental Impact Statement (EIS) for the Shannon Foynes Port Land Reclamation project.[11] This work was undertaken in February 2011, under licence from the DCHG (now DHLGH); licence numbers 10D033, 10R092.

The study area comprised the quayside, foreshore, and subtidal portion of a 290m (east-west) by 85m (north-south) area located immediately adjacent to the existing East Jetty at Shannon Foynes Port; this area being subject to proposed foreshore reclamation to improve storage and handling facilities for bulk operations within the port. The proposed work would effectively seal the existing seabed with fill material and represented a direct impact on the existing foreshore surfaces. Proposed dredging activity associated with this work also represented a direct impact on the buried sediments of the foreshore, which has the potential to expose previously unseen material of archaeological significance.

The on-site assessment was comprehensive and extended outside the confines of the proposed reclamation impact zone. The assessment noted that there is an inherent archaeological potential associated with the foreshore areas surrounding the River Shannon Estuary. However, this potential had been limited for the section of foreshore under assessment; extensive foreshore reclamation undertaken at Foynes in the 1960s having served to remove much of the potential historical and archaeological material that may have been present along the original shoreline. In addition, the data review and interpretation of both the geophysical and geotechnical investigations did not yield any evidence to suggest the presence of archaeological horizons lying exposed within the proposed reclamation area. Despite this, the potential of buried *in situ* archaeologically remained. Therefore, ADCO recommended that all ground disturbances associated with the development were archaeologically monitored and that any stonework of architectural interest identified as part of the assessment be recovered for re-use in an appropriate location in future development within the Port.

The reclamation project commenced in 2015 with the infilling of an area of foreshore located behind Berth No. 6; undertaken under LCCC Planning Permission 12/212. Localised dredging was also undertaken to facilitate the reclamation works. Archaeological monitoring of this work was undertaken by Shanarc Ltd. in October of that year, Licence No.:15E0051. No archaeologically significant material, deposits, or structures were encountered as part of that monitoring process. In fulfilment of the EIS recommendation, architectural recording of a

[11] Rex Bangerter and Niall Brady, 'Archaeological and Architectural Assessment, Foynes, Co. Limerick, Shannon Foynes Port Land Reclamation', ADCO Ltd; unpublished report 2010 and EIS Chapter 13, Archaeology and Cultural Heritage, Shannon Foynes Port Land Reclamation project.

series of worked stone pieces from the adjacent flood embankment was completed as part of the construction phase archaeological mitigation. A total of seventy-three (73) pieces of worked stone were recoded, with nine (9) pieces being subject to recovery and possible re-use.

Another programme of archaeological monitoring was also completed within the port area in 2015, undertaken by Rubicon Heritage Services Ltd. at the Argosea Warehouse site, Foynes Harbour, Durnish Td.; Licence No. 14E0397. This work was commissioned by Punch Consulting Engineers on behalf of Argosea Services Ltd. The development involved the construction of five covered, bulk and general storage, warehouses and associated site works. No archaeological features or deposits were revealed during the monitoring of this endeavour.

In 2017, ADCO was appointed by RPS, on behalf of SFPC, to undertake an Archaeological Assessment as an Environmental Impact Assessment (EIA) for the Cultural Heritage Section of the Environmental Impact Assessment Report (EIAR) for the proposed Capacity Extension and Harbour Development project within Shannon Foynes Port.[12] This project proposed the construction of a new jetty structure between the existing East Jetty and West Quay, within Shannon Foynes Port, and the development of lands to the southeast of the port estate, within Durnish Townland. The onsite archaeological work was undertaken between February 2017 and February 2018, under licence from the DCHG (now DHLGH); licence numbers 17D0017, 17R0012.

Desktop assessment indicated the presence of a range of prehistoric and more recent archaeological sites within the wider area of Foynes Port, including the site of two (2) fish traps to the east at Durnish Point, which have been recorded on Ordnance Survey maps since the nineteenth century (referenced as CF01 and CF03 in this report). However, no known archaeological sites or features were within the proposed port development areas.

The onsite assessment was comprehensive and comprised the systematic non-disturbance assessment of the areas surrounding the proposed construction impacts associated with the port development; extending significantly beyond the identified limits of each of those impacts. While no features of archaeological or historical significance were encountered within the immediate port development area, a series fishtrap structures were discovered as part of the intertidal field-walking of the foreshore adjacent to the Durnish development land

[12] Rex Bangertrer, 'Archaeological Impact Assessment, Capacity Extension and Harbour Development Project, Shannon Foynes Port, Foynes, Co. Limerick, 17D0017, 17R0012', ADCO unpublished report 12th April 2018 and Chapter 14, Archaeology and Cultural Heritage, pp.14.1-14.29 in Capacity Extension at Shannon Foynes, Environmental Impact Assessment Report (EIAR), Volume 4, RPS Group.

(see Figure 3; ADCO Features F01-F04). These archaeological sites were located outside any impact area associated with the port expansion project, but once again serve to highlight the archaeological potential of the foreshore areas surrounding Foynes.

Following grant of approval for the Capacity Extension and Harbour Development project, construction works were progressed in 2022.[13] As part of the archaeological mitigation requirement, as set out in the project EIAR, the following pre-disturbance archaeological work was carried out by ADCO in July 2022 (DHLGH licence numbers 22D0023 and 22R0088)[14]:

- Pre-disturbance survey of a *c.* 100m section of nineteenth century quay-wall (West Pier) from the historic harbour at Foynes (NIAH 21829004) to provide a permanent, metrically accurate, record of the structure.
- Archaeological inspection of foreshore (on suitable Low Water) to assess the current archaeological potential of the intertidal foreshore within the historic harbour and the East Jetty/West Quay construction area; subsequent to the primary surveys carried out by ADCO in 2017.

Pilling works between the East Jetty and West Pier commenced in late January 2023 and are ongoing. ADCO was appointed to provide archaeological monitoring during construction, in the event that any associated dredging is required as part of these works; this monitoring to be carried out under DHLGH licence number 22E0021.

Most recently, ADCO was appointed by RPS, on behalf of SFPC, as Project Archaeologist to the proposed Foynes Island Deepwater Terminal project and will be undertaking a series of pre-disturbance terrestrial, intertidal, and underwater surveys for the project UAIA and EIAR.

4.9 Conclusion

Examination of the nineteenth-century cartographic sources has provided good insight into the foreshore areas under assessment. Assessment of other desktop material has also sought to highlight the archaeological potential and historic value of the identified foreshore areas and the broader environment.

Maritime activity within the estuary is documented from early prehistoric times. The study of the wider estuary indicates that the location of Foynes within a low-lying sheltered shoreline is an ideal situation for early human activities. The presence of remains on Foynes Island and Aughinish to the east, as well as former fish weirs close to Durnish Point and at Foynes Island, reinforces this observation. In addition, a cluster of ringfort sites and an enclosure site

[13] ABP Grant of Permission 301561-18, issued 28.12.2018.
[14] Rex Bangerter, 'Archaeological Survey and Recording, West Pier, Foynes Historic Harbour and East Jetty Area, 22D0023, 22R0088', ADCO unpublished report 4th August 2022 and Rex Bangerter, 'ADCO Memorandum, Archaeological Inspection of Foreshore Reclamation Area at Berth Number 5, Shannon Foynes Port', issued 4th August 2022.

to the west of Durnish Td. also highlight continued activity throughout the early medieval period and later.

An inherent archaeological potential can be considered for the intertidal and riverbed areas within the River Shannon Estuary. Moreover, given the relatively un-developed nature of the foreshore/shoreline surrounding Foynes Island, this potential is amplified. As such, a number of archaeological mitigation measures are required in advance of the Marine SI works taking place, as detailed in Section 5.0 and Section 6.0 of this report.

5.0 PROPOSED IMPACTS[15]

A series of direct, albeit localised, foreshore/riverbed impacts will take place as part of the proposed Marine Site Investigation works. It is envisaged that one hundred and sixty-three (163) marine boreholes (225mmØ), drilled to a maximum depth of between 20m-30m,will be required.[16] One hundred and thirty-three (133) of these are to be positioned within Area A. Thirty (30) boreholes are to be located within Area B (Figure 2).

Primary impacts will arise from the boreholes themselves, with secondary impacts relating to positioning of the works-platform (jack-up barge); where the spud-legs make contact with the riverbed/foreshore. Archaeological mitigation arising from these impacts is presented in Table 3 (below) and in section 7.0. There are no impacts to known cultural heritage sites arising from the proposed Marine SI works.

Site/ Area	Potential Impacts	Archaeological Mitigation
Marine SI within Boundary at Area A location.	• No impact to known cultural heritage sites. • Potential, direct, negative impact to any unrecorded archaeological deposits or structures buried within the foreshore/riverbed.	• Marine Geophysical Data review to identify any features/anomalies of archaeological potential. • Pre-disturbance underwater/intertidal inspection of any features/anomalies deemed to be of archaeological interest. • Where features of archaeological/historic significance are positively

[15] This section does not purport to relate to precise engineering details but is rather an attempt to understand the nature of the impact on the potential archaeological environment, based on the supplied data.
[16] RPS notes that the number/depth of the required boreholes may be further refined following completion of the onsite surveys and in response to any design and environmental assessment requirements.

Site/ Area	Potential Impacts	Archaeological Mitigation
		identified, avoidance of those features is recommended. • Archaeological Monitoring of the SI works.
Marine SI within the Boundary at Area B location.	• No impact to known cultural heritage sites. • Potential, direct, negative impact to any unrecorded archaeological deposits or structures buried within the foreshore/riverbed.	• Marine Geophysical Data review to identify any features/anomalies of archaeological potential. • Pre-disturbance underwater/intertidal inspection of any features/anomalies deemed to be of archaeological interest. • Where features of archaeological/historic significance are positively identified, avoidance of those features is recommended. • Archaeological Monitoring of the SI works.

Table 3: Impacts to potential archaeological features, deposits, and/or material arising from the proposed Marine Site Investigation.

6.0 MARINE GEOPHYSCIAL SURVEY

A Marine Geophysical Survey of the foreshore boundary area will take place prior to the Marine site Investigation taking place. The geophysical survey will cover the full area of the development footprint under water, where accessible, and be carried out to the specification provided in Appendix 2 of this report; ensuring that the data gathered is to a sufficient resolution/density for reliable archaeological interpretation to take place.

Archaeological licensing/consent is required for the marine geophysical survey. ADCO will make the application submission to the DHLGH/NMS and will conduct the subsequent geophysical data review.

7.0 ARCHAEOLOGICAL MITIGATION

7.1 Pre-disturbance Measures

Archaeological survey and assessment of the terrestrial, intertidal, and underwater areas associated with proposed Foynes Island Deepwater Terminal project is to take place. This will include underwater inspection of any anomalies/features of archaeological interest arising from the Marine Geophysical Survey. In the event that features of archaeological/historic significance are encountered as part of the inspections, avoidance of those features will be recommended.

7.2 During Marine SI Works

Archaeological Monitoring of the Marine Site Investigation is recommended. The archaeological monitoring is to be carried out by to be carried out experienced maritime personnel (licence eligible); monitoring all riverbed/ intertidal disturbances arising from the proposed SI works. No seabed disturbances are to take place unless an archaeologist is present to monitor the operation. The following will be made available to the monitoring archaeologist by RPS, SFPC, and the geotechnical contractor:

- Position fixes in Lat/Long and ITM for data the archaeologists require to be logged.
- Vessel/platform track plots and fixes showing the locations of logged data in hard copy and digital format.
- Access to the Works Platform for observation purposes.
- On-board wet tank for temporary storage of archaeological material recovered during the monitoring process.
- A secure wet tank, placed in an on-shore facility, to store any artefacts or other archaeological material recovered during the monitoring process.

7.3 Management Measures

ARCHAEOLOGICAL MONITORING. Archaeological monitoring in accordance with the terms of Section 5 of the National Monuments Act (2004 Amendment) is recommended. The monitoring archaeologist will be situated so that he/she is able to view the SI works in a practicable and safe manner. In addition, they will be allowed to inspect and retrieve, for examination purposes, any material that becomes exposed and is of interest during the sampling process. The archaeologist will have a direct communication with the barge master and the lead person (supervisor) carrying out the geotechnical work. These measures will ensure that any sub-surface remains of archaeological or historic value are dealt with in an appropriate archaeological manner. The monitoring work should be undertaken by an experienced and suitably qualified (licence eligible) maritime archaeologist retained by SFPC and working under licence from the National Monuments Service at the DHLGH.

THE TIME SCALE for the Marine Site Investigation phase should be made available to the archaeologist with sufficient notice provided.

LICENCE APPLICATIONS take a minimum of four (4) working weeks to be processed by the DHLGH, and the archaeologist cannot present on site until the licences are granted. Licence applications require contact details foreshore licence holder and the associated foreshore contest number. Since 2017, Excavation Licence applications must be accompanied by a statement from the client on client letterhead that confirms ‘that sufficient funds and other facilities are available to [the archaeologist] to complete the archaeological excavation, post-excavation, and preliminary and final reports (including specialist reports)’.

SUFFICIENT NOTICE. It is essential for the developer to give sufficient notice to the archaeologist/s in advance of the SI works commencing. This will allow for prompt arrival on site to monitor the ground disturbances. As often happens, intervals may occur during the marine projects. In this case, it is also necessary to inform the archaeologist/s as to when ground disturbance works will recommence.
DISCOVERY OF ARCHAEOLOGICAL MATERIAL. In the event of archaeological features or material being uncovered during the Marine SI works, the geotechnical works should cease in the immediate area to allow the archaeologist to inspect any such material.

ARCHAEOLOGICAL MATERIAL. Once the presence of archaeologically significant material is established, full archaeological recording of such material is may be warranted. If it is not possible for the works to avoid the material, full excavation would then be recommended. The extent and duration of excavation would be a matter for discussion between the client and the statutory authorities.

ARCHAEOLOGICAL TEAM. It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This would be complemented in the event of a full excavation. Given the maritime nature of the project, the archaeological team must include underwater/dive inspection capability operating in accordance with HSE/HSA Diving at Work regulations.

SECURE SITE OFFICES and facilities should be provided on or near those sites where excavation is required.

ADEQUATE FUNDS to cover excavation, post-excavation analysis, and any testing or conservation work required should be made available.

PLEASE NOTE: The above mitigation/ recommendations are based on the information supplied for the proposed Marine Site Investigation, Foynes Island Deepwater Terminal Project, Shannon Foynes Port, Co. Limerick. Should any alteration occur, further mitigation may be required.

PLEASE NOTE: Mitigation subject to the approval of The Department of Housing, Local Government, and Heritage (DHLGH).

8.0 ACKNOWLEDGEMENTS

Thanks are extended to Ruth Barr and Mark Magee (RPS Group) and to SFPC. The report has been written by Rex Bangerter. The Marine Geophysical Survey specification in Appendix 2 was written by Niall Brady.

Appendix 1: Known Archaeological and Architectural Heritage Records for the Foynes Area.

Topographical Files, National Museum of Ireland

Reference No.	Classification	Townland	Description	Easting	Northing	Location in relation to development
Record	Stone axehead, polished	Foynes Island	Long narrow axehead polished on its cutting edge. Made from silicified black mudstone, typical of the 'Clare Shales' of Cos. Clare and Limerick, and which outcrop at the east end of Foynes Island (identified by Dr. J. Jackson 1986). L 17.7cm, W of blade 5cm, max T. 2.3cm. In private possession. (Find location identified in centre of Island on its southerly side; c. 1cm south of the island on OS sheet 10).	n/a	n/a	***c***. 320m northwest of boundary for Marine SI across Area B location.

Register of Monuments and Places

RMP No	Classification	Townland	Description	Easting	Northing	Distance to nearest development area
LI 010-001	Battery, site of	Foynes Island	Kerrigan: this was an earthwork battery for six 24-pounders; remains of the battery survive. www.clarelibrary.ie	523904	652905	40m east of the boundary for Marine SI across Area A location.
LI 010-002	Ringfort, Rath	Leahys	Located in an undulating pasture field, on east-facing slope of a low rise. Circular area (34m diameter) enclosed by earthen bank (internal height 1.3m, external height 1.8m) with external fosse (width 2m, depth 0.50m).	524122	650613	1.96km southwest of boundary for Marine SI across Area B location.
LI 010-004	Ringfort, Rath	Leahys	Located in a pasture field, on a north-facing slope. Circular area (27.8m N-S) enclosed by earth-and-stone bank (internal height 0.40m, external height 1.9m) with external fosse (width 1.5m, depth 0.20m). Site covered by dense undergrowth and trees.	524482	650973	1.45km southwest of boundary for Marine SI across Area B location.
LI 010-005	Ringfort, Rath	Ballynacragga	Located in an undulating pasture field, mixed with marshy areas and rock outcrops. Roughly circular area (32.1m N-S, 28.9 m E-W) enclosed by two concentric earth-and-stone banks with intervening fosse.	524668	650688	1.54km southwest of boundary for Marine SI across Area B location.
LI 010-006	Ringfort, Rath	Ballynacragga	Located in a pasture field, near foot of steep East-facing slope. Roughly circular area (32m N-S; 24m from bank to field boundary E-W) enclosed by earthen bank with external fosse. Because of fall in ground on west side, the enclosure is cut into the hill-slope and this is reflected in the profile of the enclosing element: on west side bank is high internally (1.7m) but shallow externally	525157	650638	1.4km south-southwest of boundary for Marine SI across Area B location.

RMP No	Classification	Townland	Description	Easting	Northing	Distance to nearest development area
			(0.45m) with the external fosse also cut into the hillside (0.7m depth, 2.25m width); on east the side the enclosing element is covered by dense overgrowth. It has a low internal height and steep external height, falling to a shallow fosse. Enclosing element truncated by north-south field boundary.			
LI 010-007	Tower House	Corgrig	In area of dense overgrowth today but situated beside a small stream, two blocks of fallen masonry lying on either side of a culverted stream; a Geraldine castle described in 1583 as large and excellent, it fell into ruins in the mid-17th century	525620.	651090	820m south of boundary for Marine SI across Area B location.
LI 010-009	Enclosure	Durnish	In rough terrain with limestone outcrops, a roughly oval area measuring 26m by 23m is enclosed by collapsed stone wall, 50cm high.	525978	651402	706m south of boundary for Marine SI across Area B location.
LI 010-109	Fulachta Fiadh complex, possible	Foynes Island	Within a coniferous plantation, the landowner reported a scatter of burnt material revealed during planting.	524226	652963	102m south-southeast of the boundary for Marine SI across Area A location.
LI 010-110001	Fulachta Fiadh	Foynes Island	Within a coniferous plantation, a kidney-shaped mound of burned material was recorded measuring 8.5m by 9.6m and 70cm high.	524456	652790	381m southeast of the boundary for Marine SI across Area A location.
LI 010-110002	Fulachta Fiadh, possible	Foynes Island	Within a coniferous plantation, the landowner reported a scatter of burnt material revealed during planting.	524509	652759	448m southeast of the boundary for Marine SI across Area A location.
LI 010-111	Fulachta Fiadh, possible	Foynes Island	Within a coniferous plantation, the landowner reported a scatter of burnt material revealed during planting, measuring 15m by 30m in size.	524649	652739	563m southeast of the boundary for Marine SI across Area A location.
LI 010-112001	Fulachta Fiadh, possible	Foynes Island	Within a coniferous plantation, on a north-facing slope. According to landowner a spread of burnt material (***c.*** 15m ***x*** c. 10m) was revealed when the area was prepared for planting.	524670	653296	253m east-southeast of the boundary for Marine SI across Area A location.
LI 010-112001	Fulachta Fiadh, possible	Foynes Island	Within a coniferous plantation, on a north-facing slope. According to landowner a spread of burnt material (***c.*** 15m ***x*** c. 10m) was	524662	653245	265m east-southeast of the

RMP No	Classification	Townland	Description	Easting	Northing	Distance to nearest development area
			revealed when the area was prepared for planting.			boundary for Marine SI across Area A location.
LI 010-135	Fulachta Fiadh	Ballynacragga	The site was part of a fulacht fiadh, with a significant part still remaining in the adjacent field to the north-east, a baulk section of which was recorded. The exposed area of the mound measured 12.5m south-east/north-west by 9.5m, and the material had a maximum depth of 0.47m. The outer edges of the spread were 0.01–0.02m deep, and the mound was cut by a modern field drain. Six layers were recorded, containing charcoal-enriched, silty clay and heat-cracked sandstone. Two additional layers exposed in the baulk section, beneath the burnt material, were sterile, silty clays, one overlying the other. Three subsoil-cut features (a trough, a roughly stone-lined hearth and a possible roasting pit) and a charcoal spread were found beneath the mound. The trough was sub-oval, measuring 1.86m by 1.8m, and was 0.8m deep, with concave sloping sides and an undulating base. The deposit in the trough contained heat-cracked stones and charcoal-rich, silty clay and was interpreted as a backfill of mound material. No lining was evident in the trough, although, when excavated, it filled with water to a depth of c. 0.1m, indicating the level of a trapped water table. The charcoal spread, 0.75m west of the trough, may have represented the waste from its cleaning. The roasting pit (0.6m south-east of the trough) was sub-oval, measuring 2.1m by 1.7m, and was 0.4m deep. It had concave sloping sides and a predominantly flat base. Laid flat at the bottom and centre of the pit were thin sandstone slabs forming a sub-rectangular platform. The platform measured 0.94m by 0.6m, and the average thickness of the stones was 0.03m. Beneath the stones was a layer of charcoal that overlay an area of scorched subsoil, which may support the theory of a roasting function. The north-western side of the pit was cut into an outcrop of naturally occurring sandstone bedrock, which was layered and split. The top few layers were pushed back into the subsoil, creating what may have been a standing/sitting work platform. A further two fills made up the remaining deposit in the pit. The lower fill was mid-grey sandy clay with occasional charcoal flecks and occasional burnt stones. The upper and final fill was dark brown, silty clay, containing occasional charcoal flecks. This final fill also contained a concentration of large, unburnt sandstones near the top, which protruded from the pit before it was excavated. The hearth was 0.25m south-east of the roasting pit. Sub-oval in plan, it had a concave profile and a rounded base. It measured 1.6m by 1.2m and was 0.1m deep. The stones delineating the hearth were naturally occurring	524501	650716.	1.59km southwest of boundary for Marine SI across Area B location.

RMP No	Classification	Townland	Description	Easting	Northing	Distance to nearest development area
			bedrock. Although there was evidence of in situ burning on the base of the hearth, no remains of the last firing were present. This suggests that the hearth was cleaned/scraped out after its last use. Because of its proximity to the possible roasting pit, it is thought likely that they were associated.			
LI 010-137	Burnt Mound	Leahys	Burnt mounded excavated under licence 02E0900 and described as a shallow mound of burnt clay and heat-shattered stone measuring 9.85m x 9.25m. Despite recent disturbance the mound reached a maximum height of 0.75m. The burnt stone itself was noteworthy, as the local geological deposits included a large band of shale, which had been used in the mound. At least two phases of site activity and mound construction were visible. A relatively thick deposit of mid-brown/black clay and burnt stone lay directly above the natural geological deposits, although this was visible only at the limit of the excavation, suggesting that most of this phase of activity fell outside the excavated area. There was no evidence of a hearth or trough associated with this area of the site. Slightly overlapping this layer was a stony, dark brown/grey clay deposit, presumably roughly contemporaneous. Immediately above these layers was evidence of the second phase of activity. This partially overlay the earlier phase, but its focus was farther east. A possible pit or trough was observed, cutting into the earlier layers. This was 0.94m wide and 0.17m deep. The northern edge of the cut was relatively steep, with straight sides, and boulders obscured the southern edge.	524453	650727	1.62km southwest of boundary for Marine SI across Area B location.

National Inventory of Architectural Heritage

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
21829003	Saint Patrick's Saw Mill, Miller's House; now SFPC office Reginal importance; architectural & artistic	Leahys	Detached four-bay two-storey with dormer attic former saw mill and mill house, built in 1863, having return to rear (south) elevation. Pitched slate roof with brick eaves course and brick chimneystacks. Timber bargeboards to dormer windows. Roughly dressed limestone walls having brick stringcourse. Square-headed openings with bipartite one-over-one pane timber sliding sash windows and limestone sills. Square-headed openings to dormer attic having timber casement windows. Square-headed opening to ground floor with one-over-one pane timber sliding sash window and limestone sill. Square-headed door opening to east elevation having brick ***voussoirs***, double-leaf glazed doors and balcony with concrete consoles and cast-iron railings.	524701	651820	1.14km west-southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			Square-headed opening having inscribed limestone lintel and glazed over-light over half-glazed timber panelled door. Square-headed opening to west elevation with timber battened door. Formerly part of a saw mill complex, this building retains much of its original fabric and presents a well composed architectural design to the streetscape. It was built by the architect William Fogarty. It was originally an agent's house constructed for Thomas Spring Rice, 1st Baron Monteagle of Mount Trenchard. The combination of red brick dressings and limestone walls combine to give a very pleasing textural and chromatic effect. Evidence of high quality workmanship can be seen in the stone detailing and brickwork execution. The surviving inscribed lintel to the door opening is an interesting historical artefact.			
21829004	Harbour/dock/port Reginal importance; architectural & technical	Corgrig	T-plan limestone pier with harbour, built in 1847. Ashlar walls and copings having recent metal railings. Concrete surface to pier and concrete ramp to west. Painted stone and cast-iron mooring posts to west and north elevations. The pier, which is still in use, attests to the proficiency of marine architects and engineers in the nineteenth century. It was erected as a part of a famine relief scheme and was a joint undertaking by the Spring Rice Family and the Commissioners of Public Works each of whom shared the cost of its construction, £10,000. It is an integral part of Foynes's architectural and social heritage, having played a significant role in the economic development of the local community.	524767	651851	1.53km west-southwest of boundary for Marine SI across Area B location.
21829005	Hotel; former	Corgrig	Detached gable-fronted two-bay three-storey former railway hotel, built c. 1870, having two-bay four-storey extension with viewing gallery to west, two-bay two-storey addition to west and four-bay two-storey addition to south. External metal staircase to west elevation. Pitched slate roof with timber bargeboards finals and rendered chimneystacks. Pitched slate roof to additions having rendered chimneystacks. Flat roof to extension. Rendered walls. Square-headed openings having two-over-two pane timber sliding sash windows and concrete sills. Round-headed opening with spoked fanlight over half-glazed timber panelled double-leaf doors. Square-headed opening to east elevation having glazed over-light over timber panelled door. Square-headed opening to west addition with render architrave over double-leaf timber panelled door with glazed over-light and flanking sidelights having timber panelled risers. Pair of square-profile limestone piers to north with carved panels, plinths and ornate caps. Decorative cast-iron railings set in limestone plinths terminating in second pair of square-profile rusticated limestone piers.	524833	651731	1.2km west-southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
21829006	Railway Station; former	Corgrig	Detached four-bay two-storey former railway station, built between 1856-58, having shallow projecting centre-bay, gable-fronted projecting end-bay, five-bay single-storey wing to east and gable-fronted train shed to rear (north) elevation. Hipped and pitched slate roofs with rendered chimneystacks and timber bargeboards. Train shed having pitched corrugated-iron roof and timber battened cladding to gables. Snecked limestone walls having tooled limestone quoins, plinth course and benchmark to front elevation. Rendered walls to rear elevation. Camber-headed openings with cut limestone ***voussoirs***, keystones, sills and six-over-six pane timber sliding sash windows. Camber-headed openings to first floor, gable-fronted projection having cut limestone voussoirs, keystones, sills and two-over-two pane timber sliding sash windows. Square-headed opening to first floor, centre-bay with limestone sill and two-over-two pane timber sliding sash window. Square-headed opening to first floor and west elevation, first floor, having limestone sills and tripartite two-over-two pane timber sliding sash windows with flanking one-over-one pane timber sliding sash windows. Recessed square-headed openings to rear having painted stone sills and six-over-six pane timber sliding sash windows. Camber-headed opening with tooled limestone block-and-start surround and half-glazed timber panelled door with flanking sidelights. Limestone steps to entrance. Camber-headed opening to wing, front elevation having tooled limestone block-and-start surround and multiple-pane glazed over-light over double-leaf timber panelled doors. Limestone steps to entrance. Recessed square-headed openings to rear having multiple-pane glazed over-lights over timber panelled doors. Snecked limestone wall to wing, east elevation with limestone copings having camber-headed pedestrian entrance with timber battened door. Limestone platform to north. Single-bay single-storey outbuilding to north-west having replacement tiled roof and cut limestone chimneystack. Camber-headed window opening with limestone block-and-start surround and sill.	524871	651796	1km west-southwest of boundary for Marine SI across Area B location.
21829007	Fountain	Corgrig	Freestanding limestone Celtic high cross style fountain, built ***c***. 1910. Cut limestone stepped base with square-profile basin, now blocked up, surmounted by rock-faced plinth with cast-iron spout to west elevation. Carved Celtic cross with inscribed limestone plaques. Inscription reads: 'This fountain is erected in grateful recognition of the numerous benefits conferred on his native country on the poor and on this neighbourhood by Sir Stephen Edward De Vere Bart, statesman, philanthropist, poet, through whose generous aid and zealous co-operation in conjunction with	524865	651730	989m west-southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			contributions from others the Catholic Church of Foynes was built. Died 10 November 1904 Aged 92 Years'.			
21829008	Signal Box	Corgrig	Detached single-bay two-storey signal box, built c. 1900. Pitched slate roof with timber bargeboards, finials and brick chimneystack. Brick walls, brick plinth course and metal external staircase to east elevation. Timber battened walls to east and west gables. Square-headed openings having fixed windows to first floor. Camber-headed openings with brick ***voussoirs***, label mouldings, terracotta sills and fixed windows. Square-headed openings to east elevation having timber battened doors. This well maintained attractive signal box retains much of its original form and fabric and forms an integral part of the Foynes Railway Station complex.	524911	651753	965m west-southwest of boundary for Marine SI across Area B location.
21829009	Water Tower; cast-iron	Corgrig	Freestanding cast-iron water tower, erected in 1892. Comprising Doric style columns joined by metal braces supporting rectangular-plan tank with raised panels and maker's name: 'H. Graham 1892 Waterford'. This water tank forms part of a group of related railway structures including the station and signal tower. Constructed in materials characteristic of such functional structures of its time, it is distinguished by the decorative raised panels to the tank.	524911	651753	958m west-southwest of boundary for Marine SI across Area B location.
21829010	Post Office & Bank; former	Corgrig	Detached H-plan seven-bay two-storey former post office and bank, built c. 1910, having recent extensions to rear (north) elevation. Hipped slate roof with rendered chimneystacks, overhanging eaves and timber brackets. Roughcast rendered walls to first floor having rusticated limestone quoins. Rusticated coursed limestone walls to ground floor with rusticated plinth course. Bipartite square-headed openings to projecting end-bays, first floor having rusticated limestone block-and-start surrounds, mullions, sills and four-over-four pane timber sliding sash windows. Tripartite square-headed openings to centre-bay, first floor and projecting end-bays, ground floor with rusticated limestone block-and-start surrounds, mullions, sills and four-over-four pane timber sliding sash windows. Quadripartite square-headed openings to centre-bay, ground floor having rusticated limestone block-and-start surrounds, mullions, sills and four-over-four pane timber sliding sash windows. Round-headed opening to centre-bay with rusticated limestone surround and inset square-headed multiple-pane fixed window and square-headed opening having multi pane over-light over timber panelled door. Square-headed openings to projecting end-bays with multiple-pane over-lights over timber panelled doors.	524954	651725	940m west-southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			Designed by William Clifford Smith, this building is a particularly attractive example of early twentieth-century Arts and Crafts style architecture, of which the projecting bays and overhanging eaves are characteristic features. Its form as well as its size and scale, mark it out in the streetscape. The long rectangular H-plan form is emphasised by the overhanging eaves and tripartite and quadripartite windows, which underscore the horizontal planes. The rusticated limestone walls to the ground floor contrast with the rendered upper floor and interest to the façade			
21829011	House & former shop	Corgrig	Detached four-bay two-storey former house and shop, built c. 1930, having shopfront to front and recent multiple-bay single-storey extensions to east elevation. Now in use as restaurant. Hipped slate roof having rendered chimneystacks, cast-iron roof-lights and overhanging eaves. Lined-and-ruled rendered walls with render quoins and plinth course. Square-headed openings to first floor having bipartite one-over-one pane timber sliding sash windows, shouldered render surrounds and render sill course. Square-headed openings to ground floor with shouldered render surrounds, concrete sills and timber casement windows. Square-headed opening having render surround and timber panelled door. Shopfront comprising timber fascia and square-headed curved multi pane display windows. Square-headed opening with half-glazed timber panelled door. This building retains much of its original fabric and presents a well composed façade to the streetscape. The fenestration to the upper floor combines to give a very pleasing symmetry. The Shannon House is a good example of the tradition of combined dwelling and shop and contributes to the streetscape and architectural heritage of Foynes.	524989	651720	907m west-southwest of boundary for Marine SI across Area B location.
21829012	House & former shop	Corgrig	End-of-terrace three-bay two-storey house and former shop, built c. 1930, having render shopfront and projecting end-bay to front (south) elevation. Half-hipped slate roof with rendered chimneystacks and render eaves course. Roughcast rendered walls having render plinth course and moulded stringcourse to recessed bay. Square-headed openings with two-over-two pane timber sliding sash windows and painted stone sills. Square-headed opening to west elevation having two-over-two pane timber sliding sash window with cast-iron sill guard. Square-headed opening having multiple-paned over-light over timber battened door. Shopfront comprising fascia with raised lettering, moulded consoles supporting heavy cornice. Square-headed display opening having multiple-paned over-lights over tripartite fixed window. Square-headed opening having multiple-paned	525012	651705	886m west-southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			over-light over half-glazed timber battened door. The projecting end-bay and decorative render shopfront distinguish this building in the streetscape. The ornamental render detailing and sash windows further mark it out and add artistic interest to the site.			
21829013	House & former shop	Corgrig	End-of-terrace three-bay two-storey house and shop, built c. 1930, having shopfront to front (south) elevation. Pitched slate roof with brick chimneystacks. Rendered walls. Square-headed openings having bipartite one-over-one pane timber sliding sash windows and painted stone sills. Square-headed opening with glazed over-light over timber panelled door. Shopfront comprising timber fascia with raised lettering and cornice. Square-headed display window. Square-headed opening having replacement glazed door. Joyce's shop is situated at the end of a terrace with a similar roof line and profile. It plays an important role in creating the streetscape and has retained many notable features such as its shopfront and bipartite timber sliding sash windows.	525054	651693	859m west-southwest of boundary for Marine SI across Area B location.
21829014	House & Shopfront	Corgrig	Terraced three-bay two-storey house and shop, built c. 1930, having render shopfront to front (south) elevation. Pitched slate roof with brick chimneystack. Rendered walls. Square-headed openings having bipartite one-over-one pane timber sliding sash windows and painted stone sills. Square-headed opening with glazed over-light over timber panelled door. Shopfront comprising fascia with raised lettering and cornice. Square-headed display window. Square-headed opening having replacement glazed door. M. A. Nolan's is part of a terrace of similar structures yet it is distinguished as a building, which has retained its character and form over the years. Though no longer used as a shop the shopfront remains virtually intact and, as a result, enlivens the modest façade. It plays a positive role in the architectural heritage of Foynes.	525063	651690	854m west-southwest of boundary for Marine SI across Area B location.
21829015	Church; formerly Saint Senan's Roman Catholic Chapel	Corgrig	Freestanding single-cell Roman Catholic Church, begun in 1868 and completed in 1932, having gable-fronted porch to north elevation and recent multiple-bay extension to south elevation. Pitched slate roof with fishscale patter, limestone bracketed eaves course, copings and finial, cast-iron ridge crestings and finial. Rusticated snecked limestone walls and buttresses to porch and corners. Canted buttress to west elevation. Paired trefoil-headed lancet stained glass quarry glazed windows to nave and east gable having chamfered limestone block-and-start surrounds	525049	651638	888m southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			and quatrefoil stained glass stained glass quarry glazed windows over. Quatrefoil window openings to east and west gable apexes and porch, east and west elevations. Oculus to east gable having inset multifoil quarry glazed window. Rose window to west gable comprising inset multifoil and quatrefoil openings and limestone surround. Oculi to west gable with inset quatrefoil quarry glazed windows. Trefoil window openings to canted buttress. Pointed arch opening to porch having roll-moulded limestone surround, Corinthian-style columns with carved limestone caps, marble banded shafts and replacement glazed double-leaf doors. Timber scissors truss ceiling to interior. Shouldered-square-headed openings to west wall having chamfered limestone surrounds, cast-iron gate to first floor opening, timber battened door to ground floor. Pointed arch opening to west wall with double-leaf timber battened doors having cast-iron strap hinges and lock. Rusticated limestone boundary walls to north having limestone cappings and single-leaf timber gate. The original church in Foynes was designed by the eminent Gothic Revival architect J.J. McCarthy. It was begun in 1868 but the was not completed until by 1932 by Ralph Henry Byrne. The original contractor was John Ryan & Son, Limerick. The site was given by Lord Monteagle to the parishioners of Foynes. McCarthy's intended transepts, chancel and central tower were not built, instead a fan-shaped nave was added alongside the south wall of the church which was then removed, so that the original nave became a re-orientated chancel. The church retains much of its simple form despite these additions to the rear. It includes original features, which mark it as a building of significance, such as the rusticated walls, which contrasts dramatically with the finely tooled limestone dressings. Saint Senan's plays a positive role on the streetscape and adds to the architectural character of the area.			
21829016	House & former shop	Corgrig	End-of-terrace three-bay two-storey house and former shop, built c. 1900, having tripartite timber shopfront to front (north) elevation. Pitched slate roof with brick chimneystacks, render copings and bracketed eaves course. Rendered walls. Round-headed openings to first floor having painted brick hood-moulding course, concrete sills and one-over-one pane timber sliding sash windows. Camber-headed openings to ground floor with painted brick hood-moulding course, concrete sills and one-over-one pane timber sliding sash windows. Camber-headed opening having glazed over-light over timber panelled door with limestone threshold. Shopfront comprising fluted pilasters, scrolled consoles, fascia having raised lettering and dentillated course	525117	651627	842m southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			and carved cornice. Square-headed display openings with inset bipartite camber-headed fixed windows having carved geometric motifs to spandrels. Brick risers. Square-headed opening with flanking fluted pilasters having ornate consoles, inset elliptical-headed over-light over double-leaf timber panelled doors.			
21829017	House & former shop	Corgrig	Detached three-bay two-storey house and shop, built c. 1900, having render shopfront to front (south) elevation. Now in use as public house. Hipped and pitched slate roof with rendered chimneystacks. Snecked rusticated limestone walls with tooled limestone quoins. Square-headed openings to first floor having tooled limestone block-and-start surrounds, limestone sills and bipartite one-over-one pane timber sliding sash windows. Shopfront comprising pilasters with scrolled consoles, fascia and moulded cornice. Square-headed display openings having inset camber-headed tripartite fixed windows with painted brick risers. Square-headed opening having glazed over-light over double-leaf timber panelled doors and flanking pilasters.	525139	651658	806m southwest of boundary for Marine SI across Area B location.
21829018	House; end of terrace	Corgrig	End-of-terrace three-bay single-storey with dormer attic house, built c. 1925. Pitched slate roof with timber bargeboards to dormer and limestone chimneystacks. Rubble limestone walls. Square-headed opening to dormer with one-over-one pane timber sliding sash window and painted stone sill. Square-headed openings to ground floor having limestone ***voussoirs***, bipartite one-over-one pane timber sliding sash windows and painted stone sills. Square-headed opening with limestone ***voussoir*** and glazed over-light over replacement timber battened door. Pair of rendered square-profile piers to north-east having single-leaf gate and rendered boundary walls. This terraced house retains its original form complete with decorative elements such as the timber bargeboards to the dormer window and limestone ***voussoirs*** to ground floor openings. Features such as the timber sash windows and slate roof help to preserve the original appearance of the building, which makes a positive contribution to the streetscape. The terrace was originally a scheme for six houses designed by the architects Clifford Smith and Newenham.	525136	651609	829m southwest of boundary for Marine SI across Area B location.
21829019	House; terraced	Corgrig	Terraced three-bay single-storey with dormer attic house, built c. 1925. Pitched slate roof with timber bargeboards to dormer and limestone chimneystacks. Rubble limestone walls. Square-headed opening to dormer with one-over-one pane timber sliding sash window and painted stone sill. Square-headed openings to ground floor having limestone ***voussoirs***, bipartite four-over-six pane timber casement windows and painted stone sills. Square-	525141	651602	832m southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			headed opening with limestone ***voussoir*** and glazed over-light over double-leaf half-glazed timber panelled doors. Pair of rendered square-profile piers to north-east having single-leaf metal gate and rendered boundary walls. This terraced house retains its original form complete with decorative elements such as the timber bargeboards to the dormer window and limestone ***voussoirs*** to ground floor openings. Features such as the timber sash window and slate roof help to preserve the original appearance of the building, which makes a positive contribution to the streetscape. The terrace was originally a scheme for six houses designed by the architects Clifford Smith and Newenham.			
21829020	House; terraced	Corgrig	Terraced three-bay single-storey with dormer attic house, built c. 1925, having shopfront to front (north-east) elevation. Pitched artificial slate roof with replacement uPVC bargeboards to dormers and limestone chimneystack. Rubble limestone walls. Square-headed openings to dormers with one-over-one pane timber sliding sash windows and painted stone sills. Square-headed opening to ground floor having limestone ***voussoirs***, bipartite one-over-one pane timber sliding sash window and painted stone sill. Square-headed opening to ground floor having limestone ***voussoirs***, one-over-one pane timber sliding sash window and painted stone sill. Shopfront comprising square-headed display openings with fixed windows and concrete sills. Recessed square-headed opening having half-glazed timber panelled door. This terraced house retains its original form complete with decorative architectural elements such as the dormer windows and limestone ***voussoirs*** to ground floor openings. Features such as the timber sash windows help to preserve the original appearance of the building, which makes a positive contribution to the streetscape. The terrace was originally a scheme for six houses designed by the architects Clifford Smith and Newenham.	525145	651594	833m southwest of boundary for Marine SI across Area B location.
21829021	House; terraced	Corgrig	End-of-terrace pair of two-bay single-storey houses, built c. 1910. Pitched slate roof with rendered chimneystack and cast-iron roof light. Roughly dressed limestone walls having dressed limestone quoins. Square-headed openings with tooled limestone block-and-start surrounds, limestone sills and two-over-two pane timber sliding sash windows. Square-headed opening to north elevation having replacement uPVC windows and limestone sills. Square-headed opening to south block having tooled limestone block-and-start surround and timber panelled door. Square-headed opening to north block with tooled limestone block-and-start	525130	651540	915m southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			surround and timber battened door. This modest pair of houses retain much of their original form and constitute part of a group of similar limestone structures. The retention of timber sash windows, the panelled and timber battened doors enhance the building's character. These cottages may have been part of a scheme designed by the architects Clifford Smith and Newenham.			
21829022	House; detached	Corgrig	Detached three-bay two-storey house, built c. 1945. Hipped slate roof. Square-headed window openings. Canted bay windows to ground floor. Pebble-dashed and rendered walls. Boundary walls to front. This house, though modest, is a significant twentieth-century urban building within Foynes. It retains its overall character and is a positive contribution to the streetscape.	525258	651440	895m southwest of boundary for Marine SI across Area B location.
21829023	House; end of terrace	Corgrig	End-of-terrace two-bay two-storey with dormer attic house, built in 1907. Hipped slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystacks. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed openings having replacement uPVC windows and rock-faced limestone sills. Square-headed opening with replacement uPVC door. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, which forms a handsome terminus of this symmetrical and picturesque terrace of six, was designed by William Clifford Smith. The terrace is distinguished by its distinctive roofline and rendered walls with well-crafted limestone dressings. The terrace's long low form and broken massing gives it a domestic scale.	525343	651397	875m southwest of boundary for Marine SI across Area B location.
21829024	House; terraced	Corgrig	Terraced three-bay two-storey with dormer attic estate house, built in 1907. Pitched artificial slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystack. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed opening to first floor having replacement uPVC window and rock-faced limestone sill. Square-headed openings to ground floor with replacement uPVC windows and continuous rock-faced limestone sill. Round-headed slightly recessed niche having rusticated limestone ***voussoirs*** and inset square-headed opening with replacement uPVC window and limestone lintel over square-headed opening with timber panelled door and rock-faced limestone lintel. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate.	525347	651392	874m southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			This house, built as part of a terrace of six, retains its original form and some distinctive features, such as the rock-faced limestone dressings and boundary walls. Designed by William Clifford Smith, the terrace is a fine example of early twentieth-century domestic architecture and plays a positive role in the architectural heritage of Foynes.			
21829025	House; terraced	Corgrig	Terraced three-bay two-storey with dormer attic house, built in 1907. Pitched artificial slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystack. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed opening to first floor having replacement uPVC window and rock-faced limestone sill. Square-headed openings to ground floor with replacement uPVC windows and continuous rock-faced limestone sill. Round-headed slightly recessed niche having rusticated limestone ***voussoirs*** and inset square-headed opening with replacement uPVC window and limestone lintel over square-headed opening with replacement uPVC door and rock-faced limestone lintel. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, built as part of a terrace of six, retains its original form and some distinctive features, such as the rock-faced limestone dressings and boundary walls. Designed by William Clifford Smith, the terrace is a fine example of early twentieth century domestic architecture and plays a positive role in the architectural heritage of Foynes.	525349	651386	876m southwest of boundary for Marine SI across Area B location.
21829026	House; terraced	Corgrig	Terraced three-bay two-storey with dormer attic house, built in 1907. Pitched slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystack. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed opening to first floor having six-over-six pane timber sliding sash window and rock-faced limestone sill. Square-headed openings to ground floor with six-over-six pane timber sliding sash windows and continuous rock-faced limestone sill. Round-headed slightly recessed niche having rusticated limestone ***voussoirs*** and inset square-headed opening with replacement uPVC window and limestone lintel over square-headed opening with half-glazed timber panelled door and rock-faced limestone lintel. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, built as part of a terrace of six, retains its original form and some distinctive features, such as the rock-faced limestone dressings, timber sash windows and boundary walls. Designed by William Clifford Smith, the terrace is a fine example of early	525352	651382	878m southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			twentieth century domestic architecture and plays a positive role in the architectural heritage of Foynes.			
21829027	House; terraced	Corgrig	Terraced three-bay two-storey with dormer attic house, built in 1907. Pitched slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystack. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed opening to first floor having replacement uPVC window and rock-faced limestone sill. Square-headed openings to ground floor with replacement uPVC windows and continuous rock-faced limestone sill. Round-headed slightly recessed niche having rusticated limestone ***voussoirs*** and inset square-headed opening with replacement uPVC window and limestone lintel over square-headed opening with replacement uPVC door and rock-faced limestone lintel. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, built as part of a terrace of six, retains its original form and some distinctive features, such as the rock-faced limestone dressings and boundary walls. Designed by William Clifford Smith, the terrace is a fine example of early twentieth century domestic architecture and plays a positive role in the architectural heritage of Foynes.	525358	651379	880m southwest of boundary for Marine SI across Area B location.
21829028	House; end of terrace	Corgrig	End-of-terrace two-bay two-storey with dormer attic house, built in 1907. Hipped slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystacks. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed openings having replacement uPVC windows and rock-faced limestone sills. Square-headed opening with replacement uPVC door. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, which forms a handsome terminus to this symmetrical and picturesque terrace of six, was designed by William Clifford Smith. The distinctive roofline and rendered walls with well-crafted limestone dressings along with the long low form and broken massing gives the terrace a domestic scale.	525359	651372	885m southwest of boundary for Marine SI across Area B location.
21829031	***Corgrig House***; detached house	Corgrig	Detached five-bay two-storey house, built c. 1800, having single-bay two-storey extension to rear (north) elevation. Pitched slate roof with render copings and rendered chimneystacks to gable ends. Roughcast rendered walls. Square-headed openings having replacement uPVC windows and limestone sills. Pointed arch opening with replacement uPVC over-light over replacement uPVC door. Cobblestones to north yard. Three-bay single-storey outbuilding to west having lean-to and external limestone staircase to south gable. Pitched corrugated-iron roof with brick	525589	651135	887m southwest of boundary for Marine SI across Area B location.

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			chimneystack. Rubble limestone walls. Square-headed window openings. Square-headed door openings having roughly dressed ***voussoirs***. Three-bay single-storey outbuilding to east with pitched corrugated-iron roof. Rubble limestone walls. Square-headed window and door openings. Elliptical-headed carriage arch to west having roughly dressed limestone ***voussoirs***. Pair of square-profile rendered piers to west with double-leaf metal gates and rendered boundary walls having limestone copings terminating in second pair of piers. This house has a well-proportioned simple design. It retains much of its original form as well as interesting features such as the gable-ended chimneystacks with external flues. The additions to the rear add context and continuity to the structure. The setting is enhanced by the simple outbuildings and carriage arch to rear/			

Historic Shipwreck Inventory

Name	Location	Date	Description	Easting	Northing	Location in relation to development
Unknown	near Foynes Island	12/08/1788	The boat was carrying three men form Limerick when it overturned in a squall. Two of the men drowned.	n/a	n/a	unknown
Castleragget	near Foynes Island	10/1833	A turf boat journeying from Limerick when she was hit by a brig. Nine people died.	n/a	n/a	Unknown
Unknown; Wreck Number W10603	Foynes Island	----	Metal-wreck visible on west shoreline of Foynes Ialnd.	524284	652526N	550m southeast of Boundary at Area A location.

Licensed Archaeological work

Source: Excavations Bulletin [www.excvations.ie]

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
1974:0025	Ringforts, two	Aughinish Island	Both sites were of similar construction, consisting of an internal and external revetment of limestone slabs and rubble core. Both measured 35m across and neither showed evidence of an accompanying ditch. Site 1 was built directly on bedrock and so no post-holes were evident. However, there was evidence of levelling and	528283	653624	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			clearance of the jagged bed-rock in one area suggesting a house site. Two large rock-cut pits were also uncovered. Traces of an occupation layer were found underlying the internal wall collapse, which produced coarse pottery, a heavily corroded iron bridle bit, a bronze chisel and pin and two saddle querns. The pin and bit are suggested to be of Halstatt C context; the chisel is of Downs type, and the pottery compares well with wares from LBA sites such as Rathgall and Lough Eskragh. It would seem that the site was built and occupied exclusively during the Late Bronze Age. At Site 2, 200 metres Se of site 1 the plan of a circular house 8m in diameter was found, along with pits and some entrance features, which produced coarse pottery of the type found at Site 1. It would, then, also appear to date to the late Bronze Age. Remains of a small rectangular stone-walled structure measuring 5m x 4m partly overlaid the collapsed fort wall but was not directly dated. It compares with a structure excavated by Mrs. Hickey (site 27 below). Excavated by Eamonn Kelly.			
1974:0028	Tower house, bawn	Aughinish Island	The castle itself dates to the late 16th-early 17th centuries and is set in a roughly circular enclosure, indicated by a low ridge showing in the grass. A preliminary trial trench was cut on the northern side of the site and this revealed the base of the bawn wall. The wall, which was well-built, averaged 2.20m in thickness and was built directly on the limestone bedrock. It was roughly circular in plan with no evidence of towers. An entrance to the bawn area was found on the southern side; it is about 3.0m wide and well cobbled with small rounded stones. To the east of the castle, a portion of the bawn wall appears to have been built on an artificially constructed 'platform' of loose stones and earth. This 'platform' which is approx. 1.0m high, would have been necessary to make this area level with the adjacent field. No evidence was found of a ditch outside the wall. An interesting feature uncovered by the excavation, was a square-built structure, 3.40m x 3.40m, situated in the northern area of the bawn, interpreted as the base for a domed oven, of the type found on medieval sites. Considerable area-excavation was carried out within the bawn, and thirty-one skeletons were uncovered, the majority being young children and babies. Finds from the site include: animal bone; sherds of late and post-medieval pottery; a wide range of iron objects; clay-pipe	528289	653637	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			fragments; a blue glass bead; a bronze disc-headed pin, and an Irish halfpenny dating to the reign of Charles 11(1683). Excavated by Ann Lynch.			
96E168	Enclosure	Aughinish West	Much of the site had been levelled in antiquity and the only extant feature was the truncated remains of a low enclosing bank that would have had a diameter of 35-40m. The interior of the site was generally flat but was very heavily overgrown until recent times. A stone wall/field boundary ran through the southern half of the site. Trenches with a combined area of 87.4m2 were opened to determine the exact nature and extent of any possible subsurface archaeological deposits or features. The only feature uncovered was a shallow linear trench located immediately inside the bank, in a localised area. No finds or other material of archaeological interest were recovered from the excavated areas. Excavated by Martin Byrne.	527584	652275	Outside
02E0302	Pit	Leahys	The pit lay on elevated ground c. 200m south of the Shannon. The pit was 1.1m long, 1m wide and 0.3m deep. The fill was crumbly, dark grey/brown, charcoal-rich clay containing numerous burnt stone fragments. The northern side of the pit was cut by a drain aligned north-east to south-west. The presence of burnt stone material in the pit fill indicates that the feature was related to a ***fulacht fiadh***, for which no other evidence was revealed. Excavated by Ken Wiggins	523586	651443	Outside
02E0469	Estuary seabed	Leahys, Co. Limerick–Shanakea, Co. Clare	A submarine section of gas pipe was laid across the River Shannon, between Leahys townland, Co. Limerick, and Shanakea townland, Co. Clare. The total length of underwater pipeline was c. 2km. Monitoring of the dredging operation observed no archaeological deposits or artefacts. Monitored by Graham Hull.	523121	651908	Outside
02E0849	Fulacht fiadh	Leahys	The site was on the north-facing cusp of a steep hill and was one of a complex of three ***fulachta fiadh*** on the hilltop. The site was a sub-oval mound, measuring 12m north–south by 9.2m by 0.8m deep; it was composed of burnt sandstone in a brown matrix. The mound overlay three intercutting troughs, a pot-boiler and a small pit. Four hearth sites were also identified. Three phases of archaeological activity were present. No artefacts were retrieved from the excavation of the site, but a small bone sample was recovered from the Phase II trough. A pollen core was taken from the peat formation in the base of the Phase III trough. Excavated by Emer Dennehy	524298	651153	Outside
02E0900	Burnt mound	Leahys	The excavated deposit was a shallow mound of burnt clay and heat-shattered stone measuring 9.85m by 9.25m. At least two	524454	650728	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			phases of site activity and mound construction were visible. A possible pit or trough was observed, cutting into the earlier layers. Excavated by Kate Taylor and Martin Jones.			
02E1767	Monitoring of dredging	Foynes Harbour	Monitoring of maintenance dredging at Foynes Port took place from 7 to 14 December 2002. Previously, the port had been dredged as part of a capital expansion scheme in 1999, and maintenance dredging was undertaken in 2001, both without archaeological monitoring. The 2002 dredging operations were designed to remove estuarine silts and debris that had accumulated since the completion of the previous dredging campaigns. Nothing of archaeological interest was observed. Monitored by Kieran Campbell	525846	651839	Adjacent
04E1306	Miscellaneous features	Aughinish	SMR Li 10:82. Test-trenching undertaken adjacent to a ringfort in advance of a gas pipeline construction project did not uncover any archaeological features or finds. Monitoring was subsequently undertaken during the gas-line construction phase and four small-scale sites were uncovered during monitoring. Site 1 comprised two pits cut into orange subsoil and connected by a 0.03m-deep shallow linear depression. Both pits contained iron slag, clay lining from the furnace pits and iron bloom in the fills and this indicates that the pits were associated with ironworking. An Early Medieval dating was suggested. Site 2 was a thin spread of shell over an area measuring 17m by 8m. The shell species included cockle, periwinkle, mussel and some oyster. Modern pottery sherds and clay-pipe fragments were found among the shell. The site was in close proximity to the estuary and the shell may have been introduced to the site as part of soil improvements where seaweed was spread as a fertiliser. Site 3a was a sub-circular pit with some bone fragments in the basal fill. A large flat stone occupied part of the base on the north end. The pit fill was charcoal-enriched brown/black soil with some burnt bone, seashell and a burnt hazelnut shell fragment. Five pieces of flint debitage were found at the base of the fill and Beaker pottery sherds were found throughout. The pottery was broken in antiquity and may have been deposited in the pit as some type of ritualistic gesture. Site 3b contained pits similar to post-pits and may indicate a settlement of unknown date in the area outside the pipeline wayleave. Site 4 was a paved area found at the edge of the wayleave	527813	652742	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			and this continued into the baulk. Eight flat stones extended over an area measuring 0.92m by 0.29m. Ash and charcoal flecks were visible on the east side. Oxidised and charcoal-flecked soil was visible 0.54m to the west. The site was probably a hearth. Excavated by Rose Cleary.			
07E0805	Landscape	Island Mac Téige, Aughinish West and Glenbane West	Geophysical survey carried out in 2007 (07R0105). Identified a number of anomalies in the form of linear features, possible pits and a large curving ditch. Test excavation revealed ten linear features in Fields 1, 4, 6, 9, 18, 19 and 20. A burnt spread was noted in Field 3. Probable post-medieval burning was visible in Field 6. A small area of burning was also noted in Field 13 and cultivation activity was noted in Fields 1, 2, 6, 7, 9 and 18–20. Excavated by Nikolah Gilligan.	577621	651488	Outside
07E1114	No archaeological significance	Durnish	Topsoil-stripping of land exposed natural bedrock below a thin covering of sod. Excavated by Ross MacLeod.	525919	651732	Outside
10D033, 10R092	Intertidal and Subtidal areas	Foynes Harbour	Environmental Impact Assessment for the Cultural Heritage Section of the Environmental Impact Assessment for the Shannon Foynes Port Land Reclamation project. Archaeological assessment of a 290m (east-west) by 85m (north-south) section of intertidal and sub-tidal foreshore, located immediately adjacent to the existing East Jetty, was undertaken. A marine geophysical survey of the proposed reclamation area was carried out by Hydrographic Surveys Ltd. in January 2011. The survey extended outside the identified works footprint and included use of both side-scan sonar and two-fish magnetometer. The geophysical data was subsequently assessed, prior to undertaking on-site assessment, with a view to highlighting any anomalies that might retain archaeological potential. The geophysical survey identified a total of twenty (20) side-scan sonar anomalies for the area under reclamation, and a further twenty for those seabed areas located to the north and south of the East Jetty structure (outside the works area). Those anomalies located within the reclamation area were subject to on-site archaeological inspection, these induced: SS20_01, SS20_03, SS20_04 and anomalies SS18_1 to SS18_17. The latter anomalies, located approximately 50m east of the viaduct, being of particular interest as the anomaly set forms two parallel runs on the	525431	651953	339m west of boundary for Marine SI across Area B location.

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			side-scan imagery. However, inspection at each target location did not reveal features of archaeological significance. Anomaly SS 20_04 proved to be of modern origin (car tire) and no targets were identified at the locations given for anomalies SS20_01, SS20_03 or SS18_1 to ss18_17. In those instances where no side-scantarget was present, it is likely that the anomaly represented a portable object that has moved subsequent to the gathering of the original geophysical data. The on-site assessment was undertaken at Low Water (LW) and comprised of field-walking the inter-tidal and upper foreshore areas, coupled with a wadded/ snorkel survey of the sub-tidal zone (max. water depth 500mm at LW). In addition, two (2) areas of archaeological potential (AP 1 & AP2), identified from cartographic sources as part of the desktop study, were inspected. The areas are indicated as fish weirs on OS First and 25-inch edition mapping for the area. AP1 is located 148m east of the proposed reclamation area with AP2 located 350m to the east. Visual inspection confirmed that no above surface indicators of these sites remain. However, it is possible that ***in-situ*** elements of these structures may remain sub-surface, buried within the estuarine mudflats that form the foreshore at these locations. The archaeological assessment was comprehensive and extended beyond the site boundaries identified for the proposed project. In addition, an architectural survey was undertaken in tandem with the on-site assessment. This was carried out by Brian O'Carroll Ltd., Conservation Architects, and comprised a visual and photographic record of the shore based elements of the port. The results of the architectural survey are appended to this report. The assessment was carried out under licence on 23rd February 2011; license numbers 10D033, 10R092.			
15E0051	Intertidal Forehore	Foynes Harbour	Archaeological monitoring of reclamation works of 2.49 ha of land at the East Jetty in Foynes Harbour, Co. Limerick was conducted from 3 March to 28 October 2015, in accordance with conditions set out by Limerick City and County Council with regards to Planning Ref. 12/212.	525375	651872	339m west of boundary for Marine SI across Area B location.

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			The archaeological brief comprised monitoring of the reclamation works, and archaeological and architectural recording of a stone revetment at the port. All of the site works, whether in the maritime environment or on land, were archaeologically monitored, and all excavated material was visually checked for potential artifacts immediately following excavation. Site works comprised demolition of the existing causeway, two small-scale areas of dredging (on both sides of the sheet pile running parallel to the existing jetty) and infilling. No features of archaeological significance were identified during these works. A geotextile membrane was laid on the mud and gravel surface, and overlaid with hardcore to infill the jetty. A stone revetment that runs along the shoreline directly south of the East Jetty was identified in the Environmental Impact Assessment as containing several pieces of worked stone which appeared to be from demolished structures. Such stones were recorded and those that were removed in the course of the works were stored for possible future re-use.			
17D0017, 17D0012	Terrestrial, intertidal foreshore, and subtidal riverbed.	Corgrig, Foynes, Foynes Harbour, Durnish	Archaeological assessment was undertaken as an Environmental Impact Assessment for the Cultural Heritage Section of the Environmental Impact Assessment Report for the proposed Capacity Extension and Harbour Development project within Shannon Foynes Port. The project comprises the construction of a new jetty between the existing East Jetty and West Quay, within Shannon Foynes Port, and the development of lands to the south-east of the port estate, within Durnish Townland. The study area encompassed subtidal, inter-tidal, and terrestrial components that extend across three areas of the project design, namely: • Area 1, a 145m (north-south) x 38m area of inter-tidal foreshore located to the west of West Quay. • Area 2, a 130m (north-south) x 237m area of inter-tidal foreshore and sub-tidal riverbed located between/behind the existing East Jetty and West Quay. • Area 3, a 797m (north-south) x 547m parcel of land (Durnish Td.) located immediately to the south-east of the eastern limit of the existing boundary of the port estate. The proposed jetty extension works will include: the removal and relocation of the existing small-craft landing pontoon to an	56239	651561	516m west and 460m south of boundary for Marine SI across Area B location.

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			area identified on the west side of the existing West Quay; construction of an open pile jetty structure, with suspended concrete deck, between the west terminus of the East Jetty and the east terminus of West Quay, tying-into same; and a transition slab to provide access from the open pile jetty structure to the Berth 5 reclamation area (this reclamation being a previously permitted development). These foreshore development areas are located within a Special Area of Conservation and have also been subject to classification as a Natural Heritage Area. Both areas lie adjacent to a Special Protection Area that encompasses the wider River Shannon Estuary. The development of the land adjacent to the port estate, in Durnish Townland, is to comprise the in-filling of the existing greenfield site with imported fill material, raising ground levels above the floodplain to facilitate the insertion of warehousing, storage and other port-related infrastructure. The archaeological assessment is based on a desktop review of existing archival and published information, interpretation of the results of geotechnical site investigations works undertaken for the project, and an on-site inspection of the relevant green-field, foreshore, quayside, and underwater areas. The desktop assessment indicates the presence of a range of prehistoric and more recent archaeological sites within the wider area of Foynes Port, including the site of two fish traps to the east at Durnish Point, which have been recorded on Ordnance Survey maps since the 19th century. However there are no known archaeological sites or features within the present port development areas. The onsite assessment was comprehensive and comprised the systematic non-disturbance assessment of the areas surrounding the proposed construction impacts associated with the port development (Areas 1-3), extending significantly beyond the identified limits of each of those impacts. The assessment provides a thorough background to the maritime landscape present, records the general topography of the areas under assessment, assesses the potential of deposits from those areas to retain archaeological material, and identifies any material, features or structures of archaeological			

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			or historic significance that are present. Visual inspection of the Durnish greenfield site and the inter-tidal foreshore areas within the port was undertaken on 13 February 2018. The underwater assessment of the sub-tidal area between the East Jetty and West Quay was carried out on 16 February 2017.			

Appendix 2: Marine Geophysical Survey specification, Foynes Marine SI

Niall Brady, 26/01/2023

Purpose of survey:

The marine geophysical survey will cover the full area of the development footprint under water where accessible.

The desired outcomes of this survey are:

- Identify and map potential geohazards
- Identify and map potential archaeological sites and features
- Facilitate the development of a ground model in support of the wider design
- Provide data and information in support of Environmental Impact Assessment

The specification is to match or exceed the proposals outlined in:

- Ruth Plets, Justin Dix, Richard Bates, ***Marine geophysics data acquisition, processing and interpretation. Guidance Notes. ,*** English Heritage, 2013***.***

Suite of instruments to be deployed:

- GNSS positioning
- Motion Reference Unit
- Multibeam Echosounder
- Sound Velocity Profiler
- Sub-bottom Profiler, chirp
- Side-scan Sonar, dual frequency, low and high
- Magnetometer, caesium
- Navigation, acquisition and processing suite
- Post-processing navigation suite
- Charting software

Surveyor:

- Competent and experienced marine hydrographer

Survey vessel:

- Dept of Marine licensed survey vessel capable of accessing all project areas at High Water

Project constraints

- Calm weather, cruising speed at less than 4 knots

Proposed tracklines

- Main lines: 20 m spacing in shallow water, increasing to not more than 50m spacing in deeper water.
- Cross lines: 200 m spacing.
- Additional infill lines in shallow areas to allow for full device-suite coverage at 100% and greater; no data gaps.

Archaeological licensing/consent

- ADCO will make application submission to DHLGH/NMS. Application will be informed by project method statement, for which the marine hydrographer will provide the following:
- Name of marine hydrography company
- Confirmation of equipment-suite deployment, equipment brands and proposed operating frequencies
- Project drawing showing proposed survey tracklines
- Project survey schedule
- Proposed survey vessel, if known

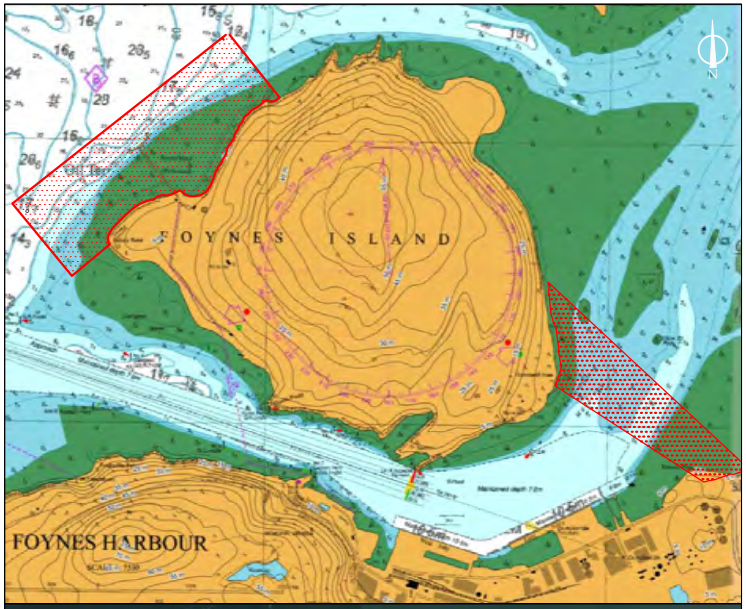
Archaeological data review

ADCO will be provided with the following data sets and reports to permit an archaeological interpretations review and report to be completed:

- Multibeam bathymetry, as high resolution GeoTIFF
- Side-scan sonar as XTF files corrected for layback for replay in CODA Survey Engine
- Side-scan sonar geo-referenced MOSAIC files
- Magnetometer as geo-referenced Magnetometer Intensity Map
- Sub-bottom profiler as SGY files for replay in CODA Survey Engine
- Survey device tracklines as SHAPE files
- Picked targets grouped into class and presented as CSV file/s with coordinates for: side-scan sonar; magnetometer and sub-bottom profile
- Marine hydrographer's report and mapping (minimum as Draft version) as PDF

ADCO's report will address:

- Receiving environment
- Survey methodology
- Constraints encountered
- Observations
- Recommendations
- Appendices listing factual observations and acoustic targets identified.



ADCO	**Notes** Source: Main- OS Discovery Series (1:50,000) Mapping Top- Admiralty Chart with 5m contours (supplied by RPS) Bottom- Google Satellite Image (captured April 2020)	A4	**Job/Exc No.** ADCO23/06	**Compiled by** R.Bangerter	**CAD reference** Foynes_Marine_SI	**Client** RPS/ Shannon Foynes Port Company	**Title** Figure 1- Location and extent of Foreshore Consent Boundary associated with Marine SI for the Foynes Island Deepwater Terminal Project.
			Date 26.01.23	**Scale** 1:50,000/ 1:25,000	**Drawing No.** Figure 1	**Project** Foynes Island Deepwater Terminal- Marine SI	

E:523596.166m
N:653836.349m

Area A
Area = 26.4ha

Area B
Area = 13.8ha

E:526438.266m
N:653836.349m

E:523596.166m
N:651336.349m

E:526438.266m
N:651336.349m

Antiquity (Site of)
Oileán Fainge
Foynes Island
Baile an Craig Thiar
Ballynastraga North
Scoil Naisiunta Sheanain
An Chorrghlaig Corgrig
Foynes Port
Dairinis Durnish
Robertstown River
Abhainn Bhaile Riobaird

Mud
Jetty
Pier Open
Open Well
Reservoir Open
Oil Depot
Spring
Museum
Tk
HWM

Signed: K. A. Guiney
Dated: 30/06/2023
Kelly Guiney CEng MICE NECReg
RPS Consulting Engineers
Elmwood House, 74 Boucher Road, Belfast, BT12 6RZ

CYAL50270502
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NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. Datum.

- HWM
- Maritime Area
- Borehole (Phase 1)
- Borehole (Phase 2)
- Grab Sample
- Area for Geophysical Survey

Map Series | Map Sheets
1:2,500 | 4795-D
1:2,500 | 4795-B
1:2,500 | 4858-B
1:2,500 | 4794-D
1:2,500 | 4795-C
1:2,500 | 4858-A
1:2,500 | 4795-A
1:5,000 | 4794
1:5,000 | 4795

rev	amendments	check	date
C01	Issue for Approval	M.H.	08/03/2023

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W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Foynes Island Deepwater Development - Marine SI

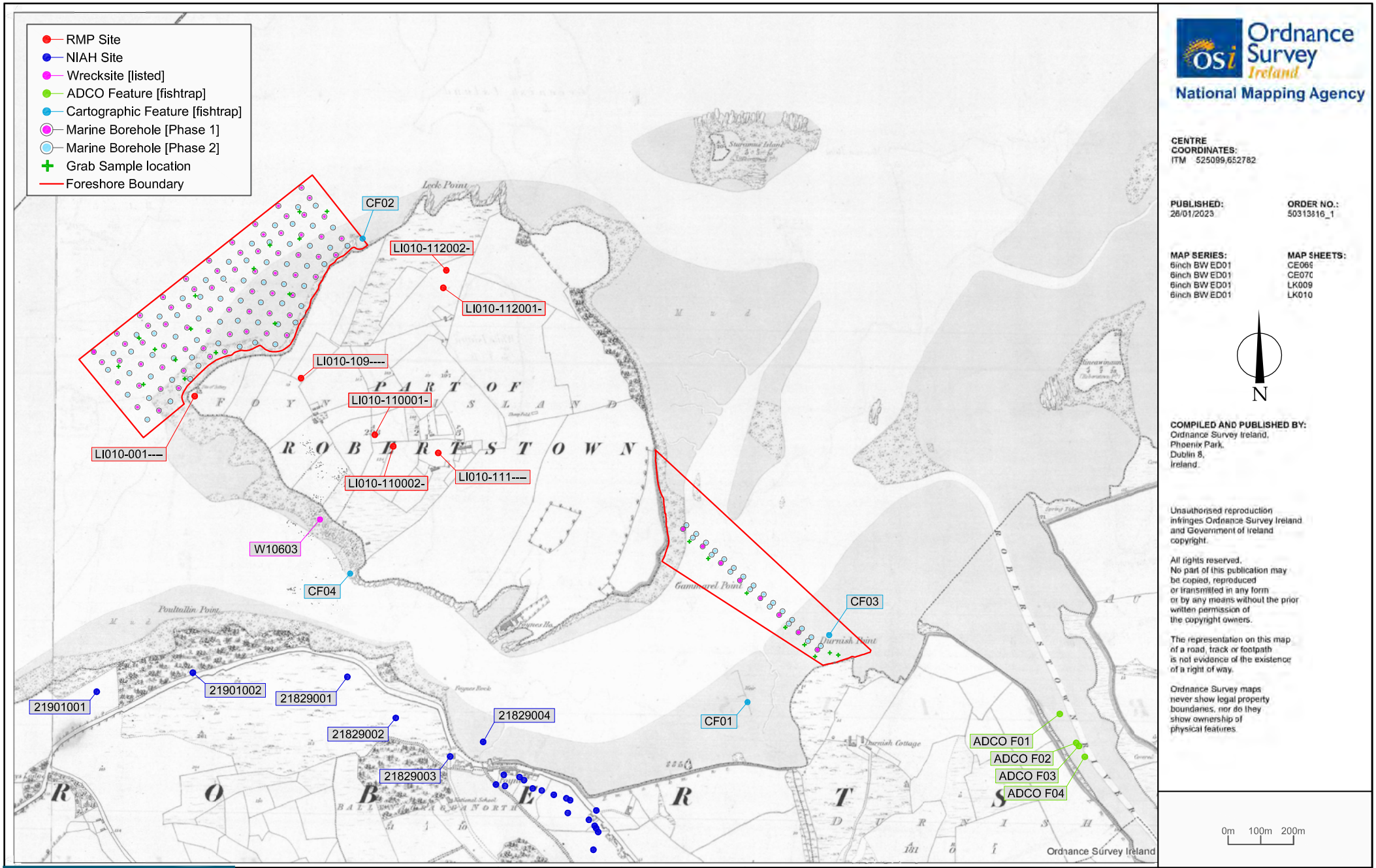
Title
Marine Site Investigation - Layout

Project Number	Sheet Size	Drawing Scale
IBM0845	A3	1:5000

Drawing Number
Figure 2

Drawn By	Status	Revision
M.H.	A3	C01

Checked By	Approved By	Date
S.A.H.	S.A.H.	22/02/2023



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CENTRE COORDINATES:
ITM 525099,652782

PUBLISHED: 26/01/2023
ORDER NO.: 50313816_1

MAP SERIES:	MAP SHEETS:
6inch BW ED01	CE066
6inch BW ED01	CE070
6inch BW ED01	LK009
6inch BW ED01	LK010

N

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Dublin 8,
Ireland.

0m 100m 200m

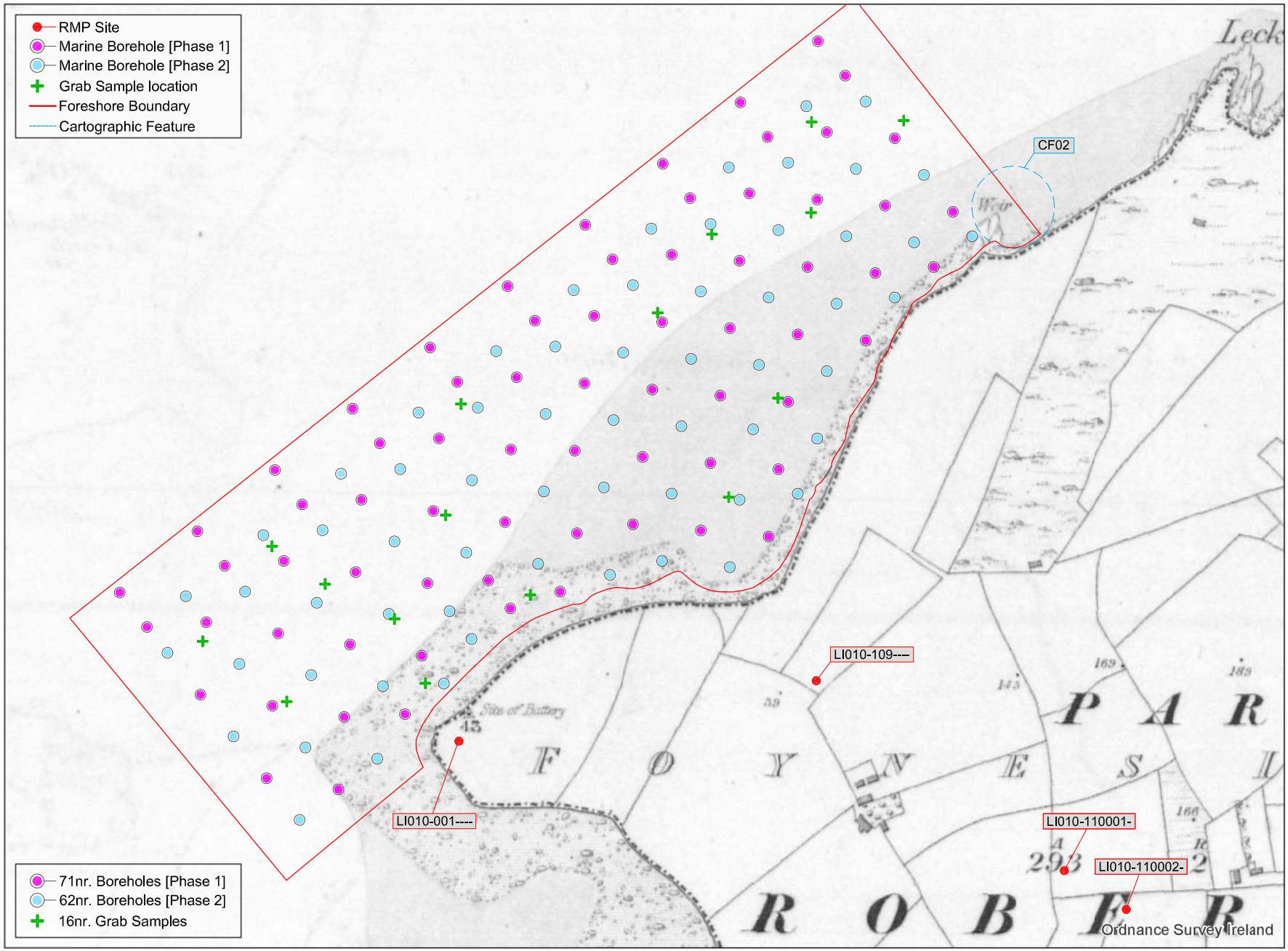
ADCO

Notes
Source:
Map- OSI Historic Map Archive
RMP/NIAH Sites- Limerick Sheet 10/ NMS database [maps.archaeology.ie]
Wreck Sites- NMS Wreck Viewer [dahg.mpas.arcgis.com]

A4

Job/Exc No.	Compiled by	CAD reference	Client
ADCO23/06	R.Bangerter	Foynes_Marine_SI	RPS/ Shannon Foynes Port Company
Date	**Scale**	**Drawing No.**	**Project**
26.06.23	1:15,000	Figure 3	Foynes Island Deepwater Terminal- Marine SI

Title
Figure 3- Extract from OS First Edition Map (1840-1842) showing Foynes Island with surrounding Cultural Heritage Sites and extent of proposed Marine Site Investigation superimposed.



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CENTRE COORDINATES:
ITM 524067,653150

PUBLISHED: 26/01/2023
ORDER NO.: 50313816_2

MAP SERIES: 6inch BW ED01, 6inch BW ED01
MAP SHEETS: CE069, LK010

N

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0m 50m 100m

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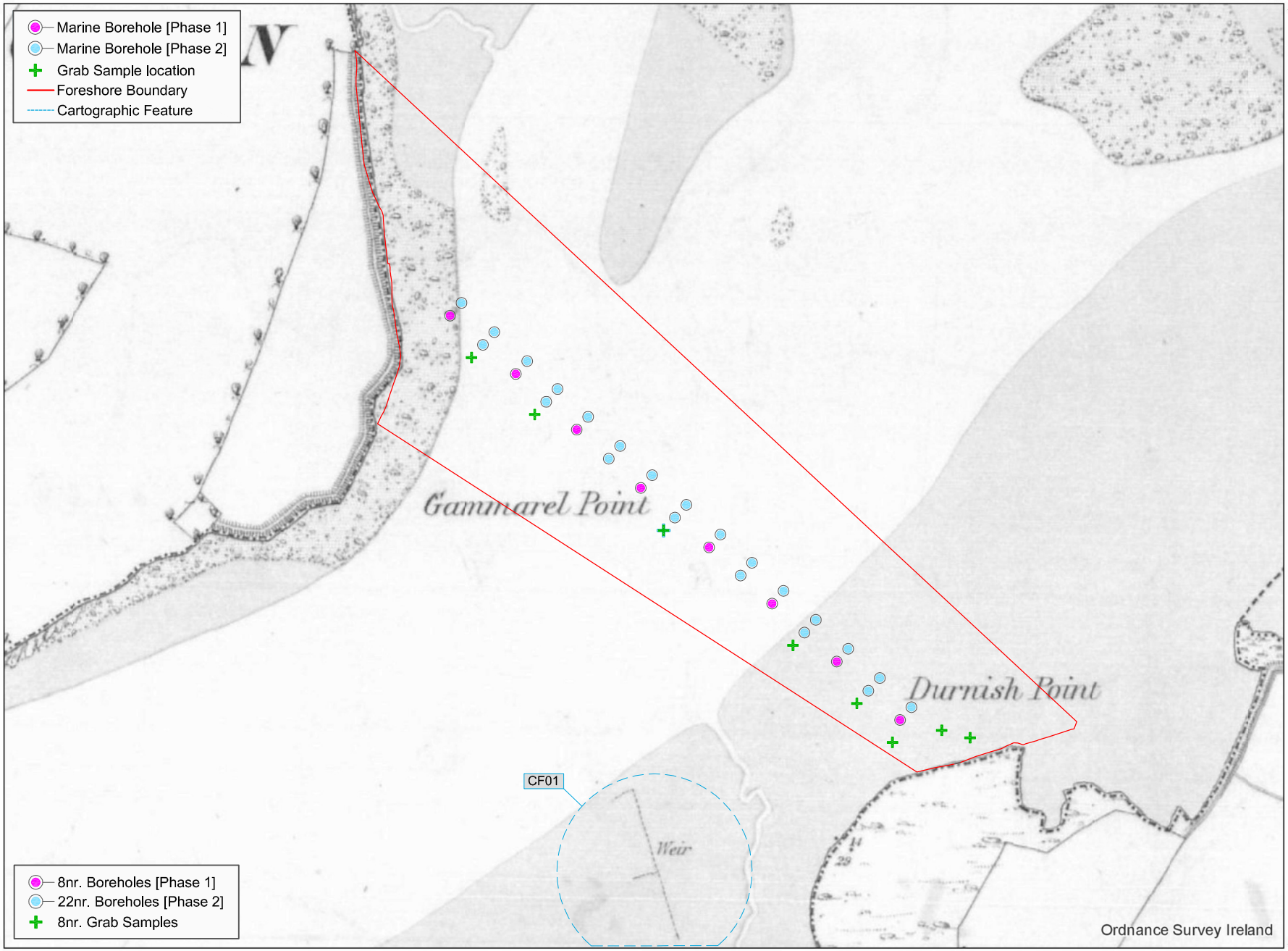
Notes
Source:
Map- OSi Historic Map Archive
RMP Sites- Limerick Sheet 10/ NMS database [maps.archaeology.ie]

A4

Job/Exc No.	Compiled by	CAD reference	Client
ADCO23/06	R.Bangerter	Foynes_Marine_SI	RPS/ Shannon Foynes Port Company
Date	**Scale**	**Drawing No.**	**Project**
26.06.23	1:5000	Figure 4	Foynes Island Deepwater Terminal- Marine SI

Title
Figure 4- Extract from OS First Edition Map (1840-1842) with extent of Marine SI (133nr. Boreholes) at location of proposed Deepwater Terminal superimposed.



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CENTRE COORDINATES:
ITM 525567,652356

PUBLISHED: 26/01/2023
ORDER NO.: 50313816_5

MAP SERIES:	MAP SHEETS:
6inch BW ED01	CE069
6inch BW ED01	CE070
6inch BW ED01	LK010

N

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0m 50m 100m

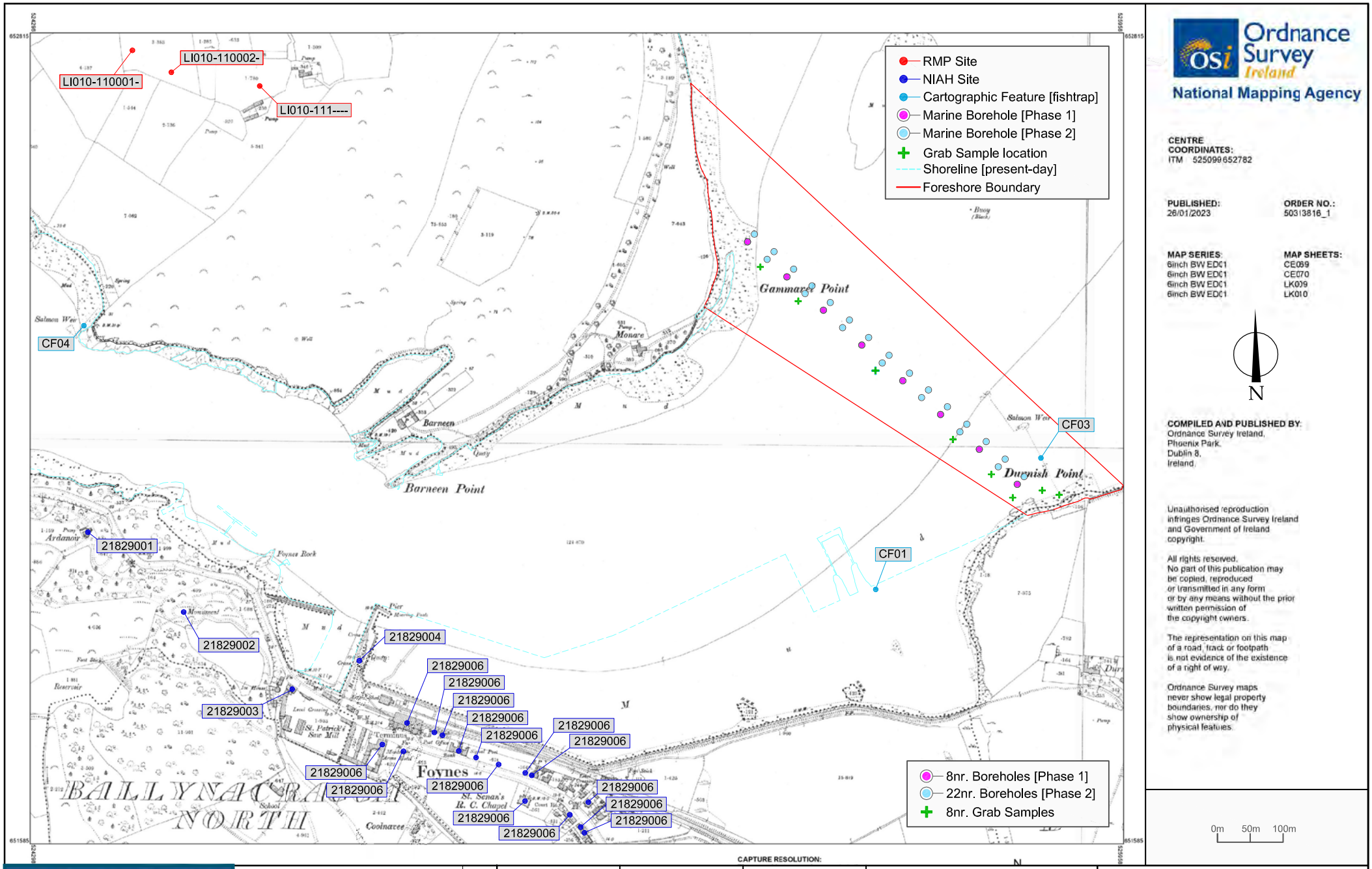
ADCO

Notes
Source:
Map- OSi Historic Map Archive

A4

Job/Exc No.	Compiled by	CAD reference	Client
ADCO23/06	R.Bangerter	Foynes_Marine_SI	RPS/ Shannon Foynes Port Company
Date	**Scale**	**Drawing No.**	**Project**
26.06.23	1:5000	Figure 5	Foynes Island Deepwater Terminal- Marine SI

Title
Figure 5- Extract from OS First Edition Map (1840-1842) with extent of Marine SI (30nr. Boreholes) at location of proposed Road-Bridge superimposed.



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National Mapping Agency

CENTRE COORDINATES:
ITM 525099 652782

PUBLISHED: 26/01/2023
ORDER NO.: 50313816_1

MAP SERIES:	MAP SHEETS:
6inch BW ED01	CE039
6inch BW ED01	CE070
6inch BW ED01	LK039
6inch BW ED01	LK010

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CAPTURE RESOLUTION:

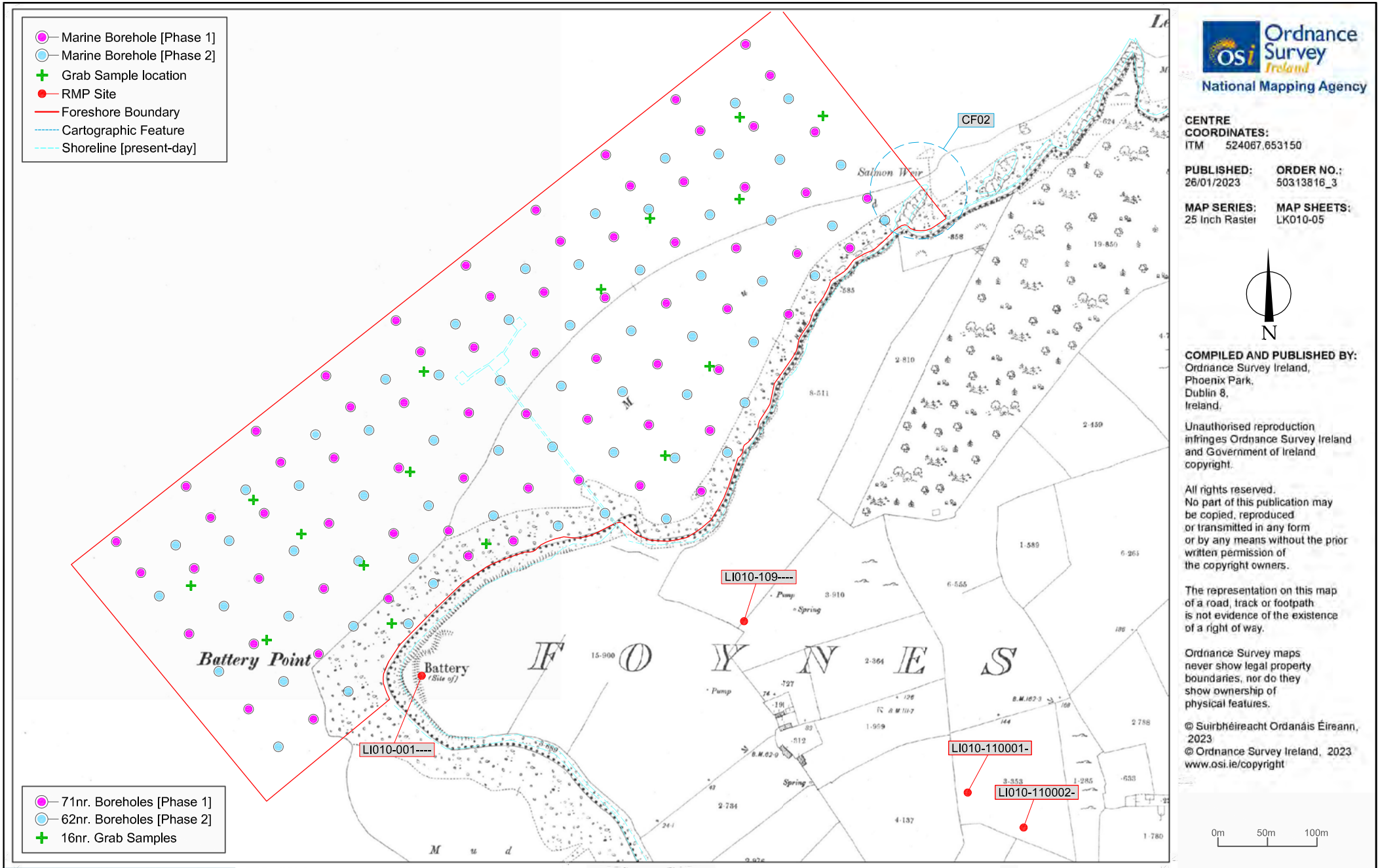
ADCO

Notes
Source:
Map- OSi Historic Map Archive
RMP/NIAH Sites- Limerick Sheet 10/ NMS database [maps.archaeology.ie]

A4

Job/Exc No.	Compiled by	CAD reference	Client
ADCO23/06	R.Bangerter	Foynes_Marine_SI	RPS/ Shannon Foynes Port Company
Date	**Scale**	**Drawing No.**	**Project**
26.01.23	1:7,500	FIgure 6	Foynes Island Deepwater Terminal- Marine SI

TItle
Figure 6- Extract from OS 25-inch Edition Map (1898) showing south side of Foynes Island with surrounding Cultural Heritage Sites superimposed.



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CENTRE COORDINATES:
ITM 524067,653150

PUBLISHED: 26/01/2023
ORDER NO.: 50313816_3

MAP SERIES: 25 Inch Raster
MAP SHEETS: LK010-05

N

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Ireland.

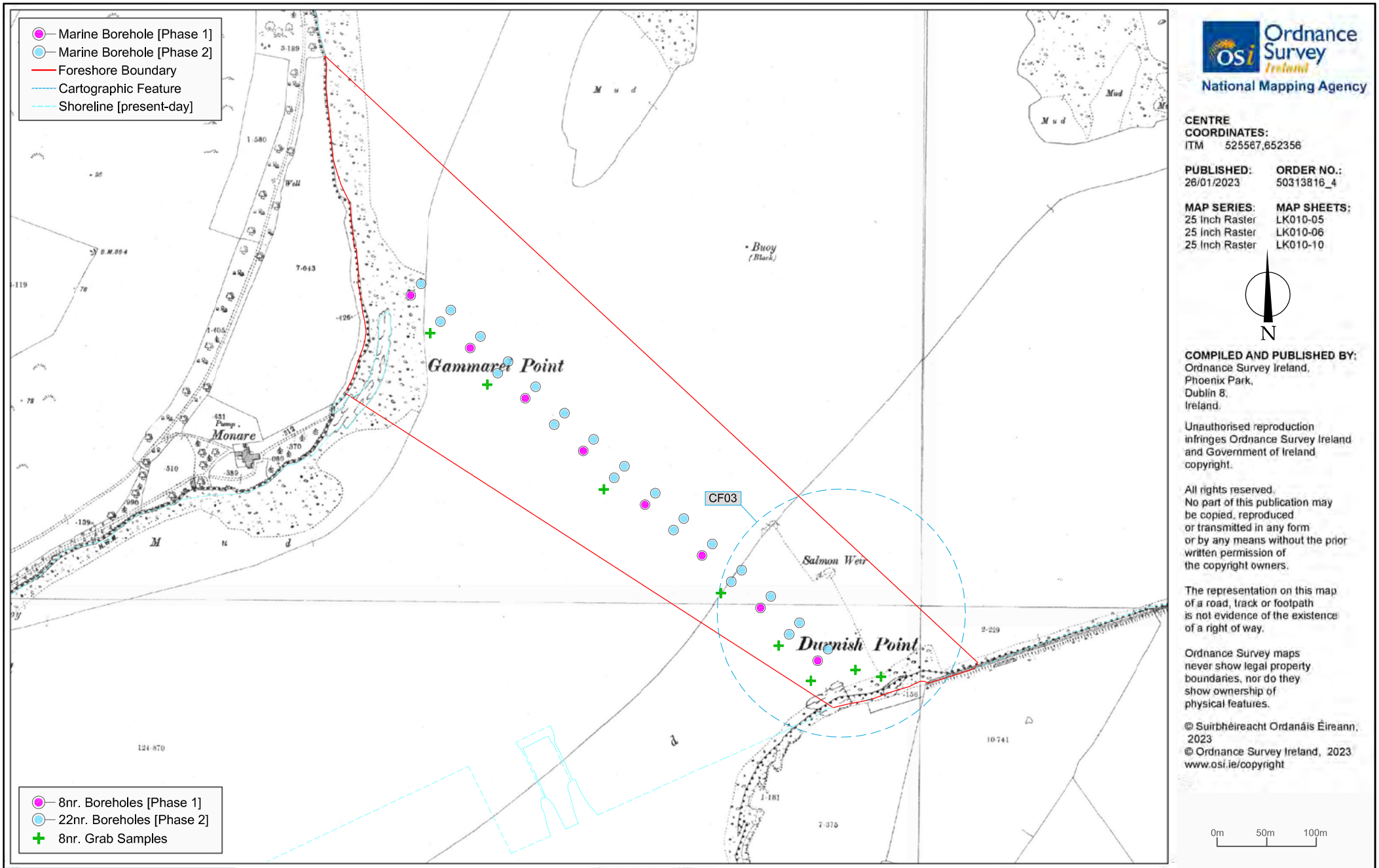
ADCO

Notes
Source:
Map- OSi Historic Map Archive
RMP Sites- Limerick Sheet 10/ NMS database [maps.archaeology.ie]

A4

Job/Exc No.	Compiled by	CAD reference	Client
ADCO23/06	R.Bangerter	Foynes_Marine_SI	RPS/ Shannon Foynes Port Company
Date	**Scale**	**Drawing No.**	**Project**
26.06.23	1:5000	Figure 7	Foynes Island Deepwater Terminal- Marine SI

Title
Figure 7- Extract from OS 25-inch Edition Map (1898) with extent of Marine SI (133nr. Boreholes) at location of proposed Deepwater Terminal superimposed.



Ordnance Survey Ireland
National Mapping Agency

CENTRE COORDINATES:
ITM 525567,652356

PUBLISHED: 26/01/2023
ORDER NO.: 50313816_4

MAP SERIES:	MAP SHEETS:
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25 Inch Raster	LK010-06
25 Inch Raster	LK010-10

N

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Ireland.

0m 50m 100m

ADCO

Notes
Source:
Map- OSi Historic Map Archive

A4

Job/Exc No.	Compiled by	CAD reference	Client
ADCO23/06	R.Bangerter	Foynes_Marine_SI	RPS/ Shannon Foynes Port Company
Date	**Scale**	**Drawing No.**	**Project**
26.06.23	1:5000	Figure 8	Foynes Island Deepwater Terminal- Marine SI

Title
Figure 8- Extract from OS First Edition Map (1898) with extent of Marine SI (30nr. Boreholes) at location of proposed Road-Bridge superimposed.

ADCO

RMP Site
NIAH Site
Wrecksite [listed]
Foreshore Boundary
Marine Borehole [Phase 1]
Marine Borehole [Phase 2]
Cartographic Feature [fishtrap]

Title
Figure 9- Aerial Images of Foynes Island with layout/extent of Marine Site Investigation superimposed.

Client
RPS/ Shannon Foynes Port Company

Top- Google Satellite Image captured 05.2017
Bottom- Google Satellite Image captured 04.2022.

A4

Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Foynes Island Deepwater Terminal- Marine SI	ADCO23/06	R.Bangerter	Foynes_Marine_SI	26.06.23	1:10,000	Figure 9

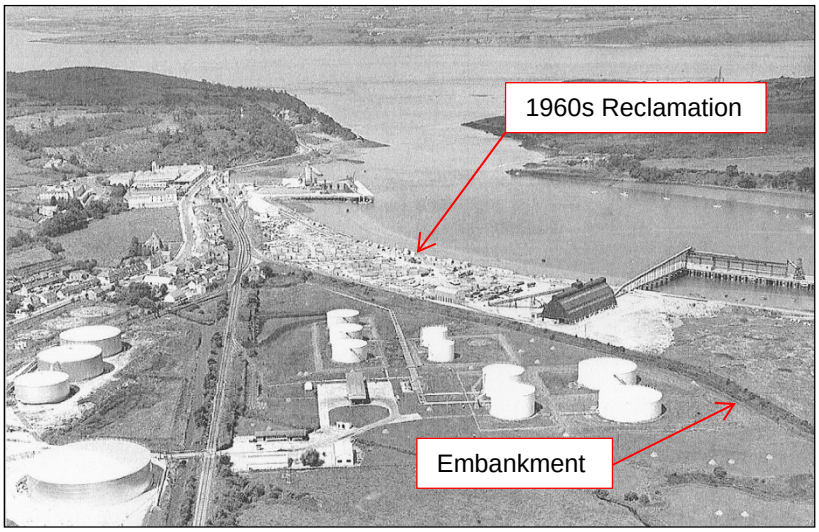

Plate 1: Northwest-facing view of Foynes subsequent to foreshore reclamation and expansion of the Port in the 1960s. Note: flood embankment running between northernmost silos and the newly reclaimed foreshore area (source: eirtrains.com).

Plate 2: Aerial-view, northwest-facing, of present-day Shannon Foynes Port (source: SFPC).

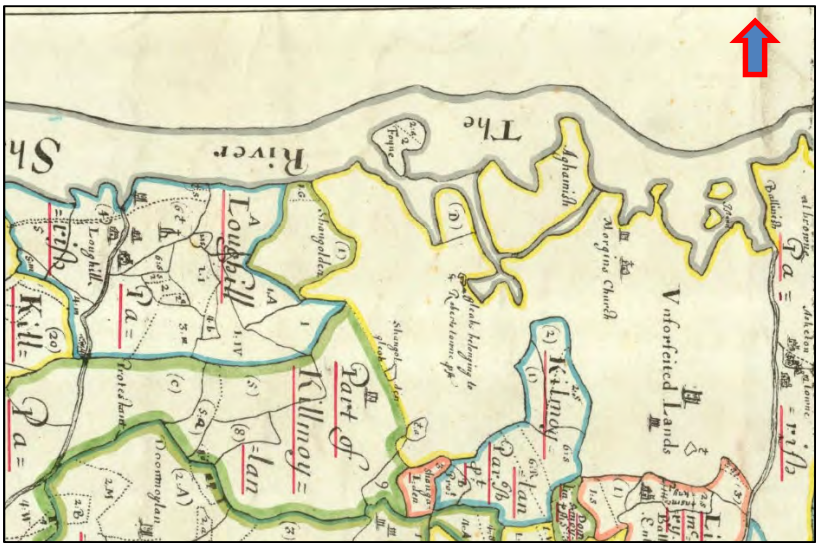

Plate 3: Extract from the Down Survey Mapping of 1656-58; ***Barony of Connello (***source: downsurvey.tcd.ie/down-survey-maps).

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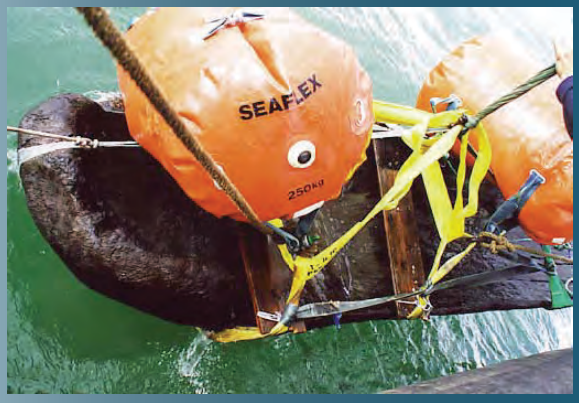

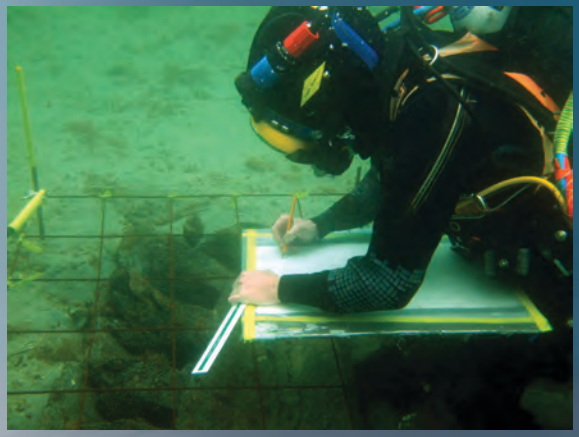

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