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MULTIDISCIPLINARY CONSULTING ENGINEERS

D866: NATIONAL WATERSPORTS CAMPUS DÚN LAOGHAIRE

NATURA IMPACT STATEMENT - NIS

For

Dún Laoghaire-Rathdown County Council

14 October 2026

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DOCUMENT CONTROL & HISTORY

OCSC Job No: D866	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	D866	OCSC	ZZ	ZZ	RP	YE	804	S2	P03

Rev.	Status	Authors	Checked	Authorised	Issue Date
P01	**S2**	Rebecca Duane MCIEEM Torchia McQuaid	Eadaoin Butler MCIEEM	Eleanor Burke CSci	16/09/2026
P02	**S2**	Rebecca Duane MCIEEM Torchia McQuaid	Eadaoin Butler MCIEEM	Eleanor Burke CSci	09/10/2026
P03	**S2**	Rebecca Duane MCIEEM	Eadaoin Butler MCIEEM	Eleanor Burke CSci	14/10/2026

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1 INTRODUCTION

1.1 PROJECT CONTRACTUAL BASIS & PARTIES INVOLVED

This Natura Impact Statement (NIS) has been prepared by O'Connor Sutton Cronin & Associates Ltd. (OCSC) on behalf of Dún Laoghaire-Rathdown County Council in relation to the proposed marine and coastal site investigation works associated with the National Watersports Campus at Dún Laoghaire Harbour, Co. Dublin. The proposed site investigation works are being undertaken to inform the design, feasibility and environmental assessment of future watersports infrastructure. The proposed site investigation works comprise a programme of temporary marine and coastal investigations within and adjacent to Dún Laoghaire Harbour. The works include marine and terrestrial boreholes, Cone Penetration Testing (CPT), vibrocore sampling and multibeam bathymetric surveying. The investigations will provide information on seabed conditions, subsurface geology, sediment characteristics and bathymetry within the defined MUL application area. The proposed works are temporary in nature and will be undertaken at discrete locations within intertidal and subtidal areas. The locations of the proposed works are shown in Figure 1.1.

This NIS is in support of an application for a Maritime Usage Licence (MUL) to the Maritime Area Regulatory Authority (MARA). As part of its consideration of the MUL application, MARA requested that a Natura Impact Statement be prepared to inform Stage 2 Appropriate Assessment. This NIS has therefore been prepared in response to MARA's request which specifically requests a *Natura Impact Statement (NIS) for the sites and impacts listed in MARA's Appropriate Assessment Screening and Determination Report only (i.e. underwater noise and marine mammals)*.

The European Sites considered in this NIS are:

- Rockabill to Dalkey Island SAC (003000)
- Codling Fault Zone SAC (003015)
- Lambay Island SAC (000204)

As part of its consideration of the MUL application, the Maritime Area Regulatory Authority (MARA) requested that a Natura Impact Statement be prepared under section 117(6)(a) of the Maritime Area Planning Act 2021, to further assess the potential implications of the proposed site investigation works for specific European Sites. This NIS has therefore been prepared in response to that request and provides additional scientific information to support the competent authority in undertaking an Appropriate Assessment of the proposed works.

The NIS considers the potential effects of the proposed site investigation works on the relevant Qualifying Interests (QIs) and conservation objectives of these European Sites, with a particular focus on potential effects arising from underwater noise. The potential for effects in combination with other plans and projects is also considered.

The NIS describes the proposed site investigation works and the receiving ecological environment and assesses the potential effects of the works, both alone and in combination with other plans and projects, on

the relevant QIs and conservation objectives of the screened-in European Sites. Where potential impact pathways have been identified, appropriate mitigation measures and environmental controls have been incorporated into the proposed works and associated methodologies to avoid, prevent or reduce potential adverse effects on the integrity of the European Sites.

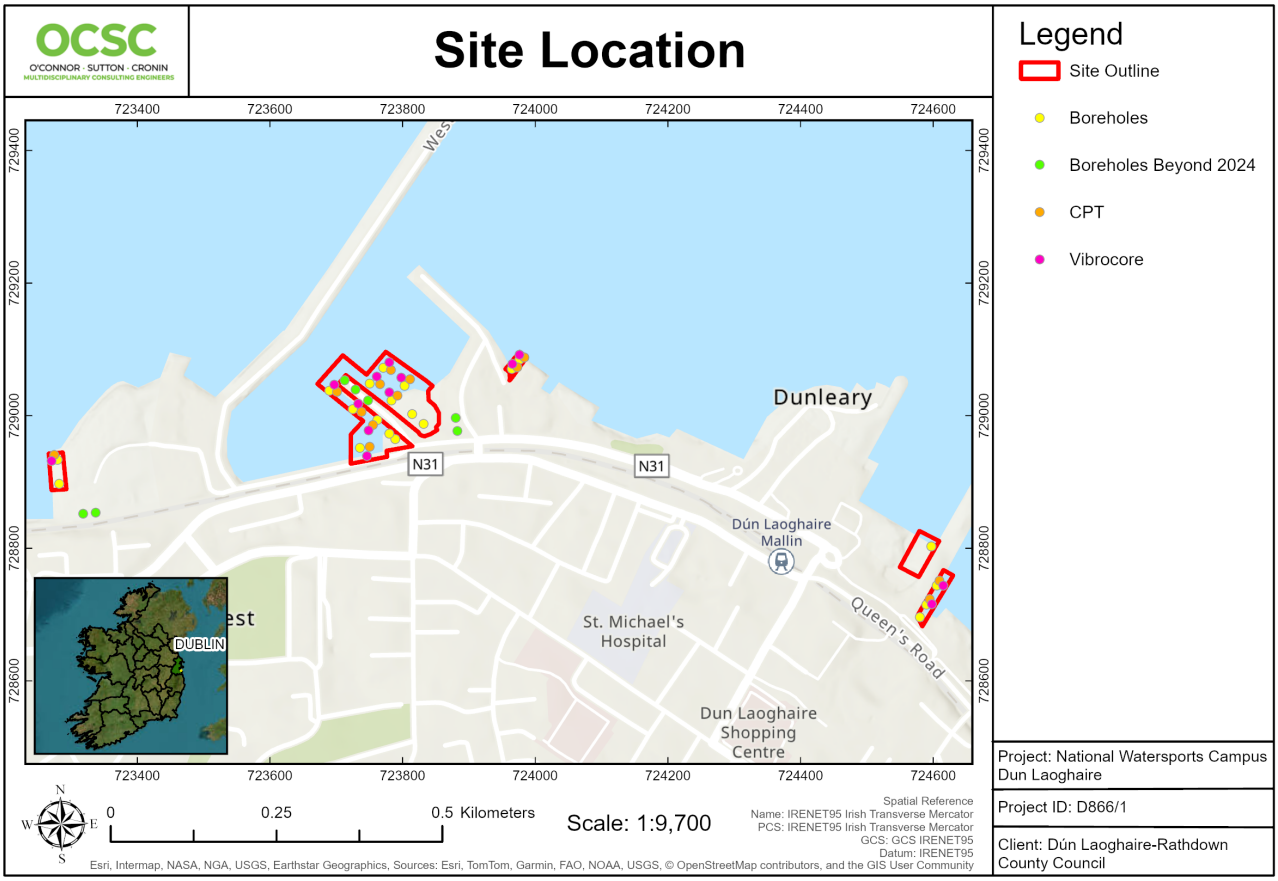


Figure 1.1: Site Location (Source: OCSC, 2026)

The report was compiled by Rebecca Duane, BSc, MCIEEM, assisted by Torchia McQuaid, BSc, MSc, Junior Ecologist; reviewed by Eadaoin Butler, BSc, MCIEEM; and authorised by Eleanor Burke, BSc, MSc, DAS, MIEnvSc, CSci, OCSC Environmental Director.

1.2 PURPOSE OF THE PROJECT

The proposed site investigation works comprise a programme of marine and coastal site investigation associated with the proposed National Watersports Campus at Dún Laoghaire Harbour, Co. Dublin. The site investigation works will be undertaken within and adjacent to Dún Laoghaire Harbour and are required to inform the design, feasibility and environmental assessment of future watersports infrastructure. The works are also required to support an application for a Maritime Usage Licence (MUL) to the Maritime Area Regulatory Authority (MARA).

The purpose of the proposed site investigation works is to obtain information on the existing seabed and subsurface conditions within the defined MUL application area. The investigations will provide information on seabed conditions, subsurface geology, sediment characteristics and bathymetry, which will inform the engineering design and environmental assessment of the proposed future National Watersports Campus infrastructure.

The proposed site investigation works will comprise marine and terrestrial boreholes, Cone Penetration Testing (CPT), vibrocore sampling and multibeam bathymetric surveying. Marine boreholes will be undertaken using either sonic drilling or cable percussion boring, followed by rotary core drilling where required. CPT investigations will provide in-situ information on soil strength and deformation properties, while vibrocore sampling will facilitate the recovery of sediment samples for laboratory-based environmental and geotechnical testing. A multibeam echosounder survey will also be undertaken to provide high-resolution bathymetric data of the harbour seabed.

The proposed site investigation works are temporary in nature and will be undertaken at discrete locations within and adjacent to the harbour, including intertidal and subtidal areas. The works will not involve the construction of the future National Watersports Campus and are intended solely to obtain the information required to support the future design, feasibility and environmental assessment of the proposed watersports infrastructure.

The site investigation works will involve the use of marine and terrestrial plant and equipment and will require limited, localised disturbance of seabed and ground materials at individual investigation locations. Appropriate construction methodologies and environmental controls will be implemented during the works to manage potential effects including those associated with underwater noise. Figure 1.2 shows the proposed MUL application area, and the location of the proposed site investigation works.

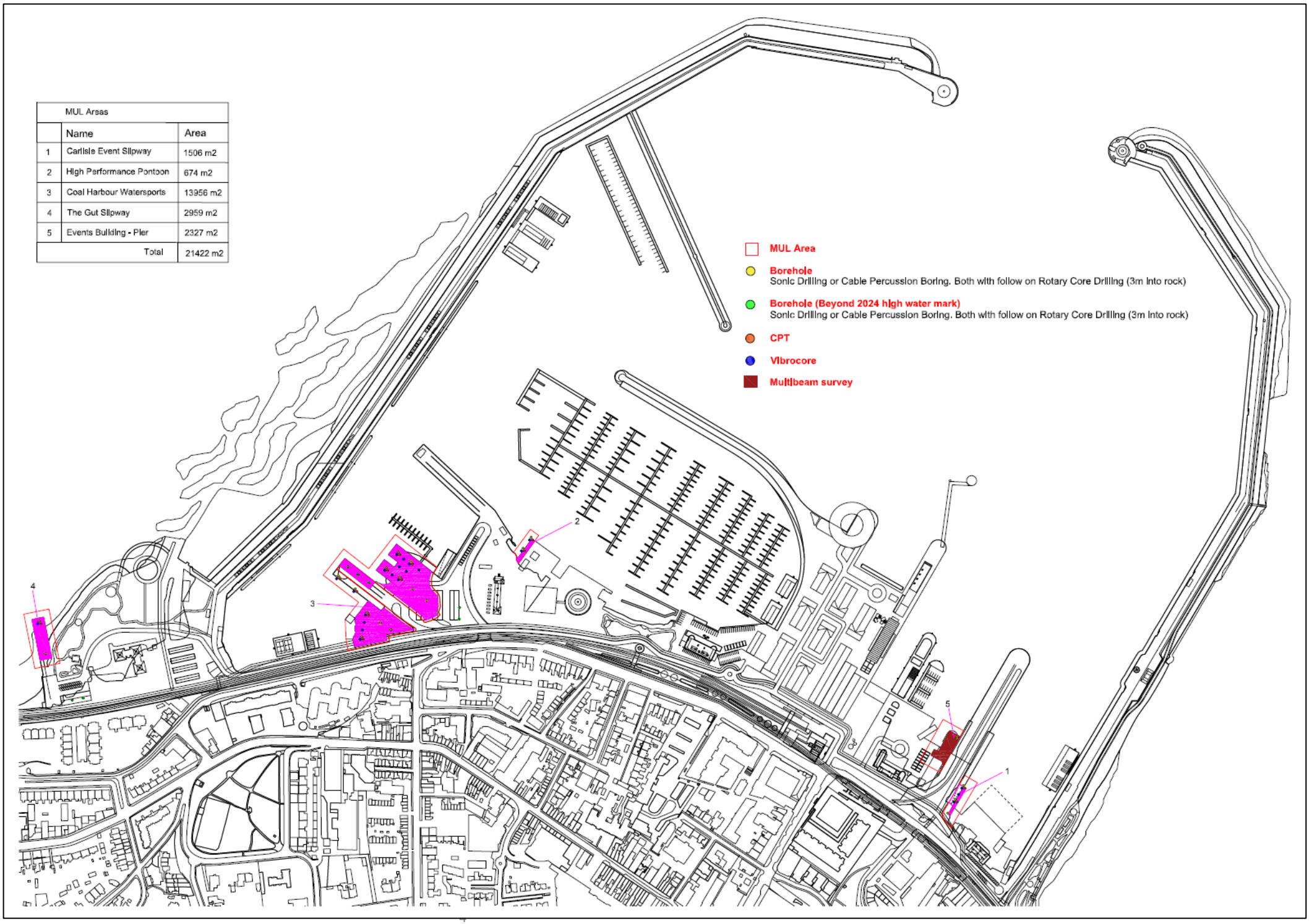


Figure 1.2: Proposed MUL application area, and the location of the proposed site investigation works.

1.3 RELEVANT QUALIFYING INTERESTS, SPECIAL CONSERVATION INTERESTS AND CONSERVATION OBJECTIVES

The proposed site investigation works are located within and adjacent to Dún Laoghaire Harbour and are in proximity to a number of European Sites. A Stage 1 Appropriate Assessment Screening was previously undertaken in support of the MUL licence application and concluded that the proposed site investigation works would not be likely to have a significant effect on any European Site, either alone or in combination with other plans or projects, in view of the conservation objectives of the European Sites.

As part of its consideration of the MUL application, MARA requested that a Natura Impact Statement (NIS) be prepared to provide under Section 117(6)(a) of the Maritime Area Planning Act 2021 to further assess the potential implications of the proposed works for European Sites. Following its Appropriate Assessment Screening determination, MARA requested three specific European Sites for further assessment within this NIS, having regard to the potential impact pathway associated with underwater noise from the proposed intrusive site investigation works.

The relevant Qualifying Interests (QIs) of the European Sites identified by MARA and considered further in this NIS are presented in Table 1.1.

Table 1.1: Qualifying Interests Brought Forward from Stage 1 Appropriate Assessment Screening

European Sites	Qualifying Interest	Conservation Objective	Reason for Inclusion in Stage 2 AA
Rockabill to Dalkey Island SAC (003000) **2.7km**	[1351] Harbour Porpoise	Maintain favourable conservation condition	Potential effects arising from underwater noise generated by the proposed intrusive site investigation works, including marine borehole drilling, CPT, vibrocore sampling and associated marine plant and vessel activity, with the potential for temporary disturbance or displacement of marine mammals.
Codling Fault Zone SAC (003015) **29.8km**	[1351] Harbour Porpoise		
Lambay Island SAC (000204) **21.7km**	[1351] Harbour Porpoise		
	[1364] Grey Seal		
	[1365] Harbour Seal		

The remaining Qualifying Interests associated with these European Sites, together with the Qualifying Interests and Special Conservation Interests of the other European Sites considered during the Stage 1 Appropriate Assessment Screening, were screened out as no plausible source–pathway–receptor relationship capable of giving rise to likely significant effects was identified. These interests are therefore not considered further within this Natura Impact Statement.

1.4 NATURA IMPACT STATEMENT

The report prepared for the second stage of AA is referred to as an NIS. The approach taken to preparing the NIS is as follows:

- Set out information on the European Sites and relevant QIs considered further in this NIS following the request from MARA.
- Describe how the proposed site investigation works may affect the relevant QIs and their relevant habitats and ecological functions supporting the QIs, including potential effects associated with, underwater noise. Any uncertainties and gaps in information are identified where relevant.
- Set out the conservation objectives of the relevant European Sites and identify the Qualifying Interests (QIs) relevant to the assessment.
- Describe how the proposed site investigation works may affect the relevant QIs and their relevant habitats and ecological functions supporting the QIs and SCIs, including potential effects associated with temporary noise disturbance. Any uncertainties and gaps in information are identified where relevant.
- Describe how the integrity of the relevant European Sites, having regard to their structure, function and conservation objectives, may be affected by the proposed site investigation works. Potential effects including disturbance are considered with any uncertainties or gaps in information.
- Identify appropriate mitigation measures and environmental controls required to avoid, prevent or reduce potential adverse effects on the integrity of the relevant European Sites.
- Assess the potential for adverse effects on site integrity following implementation of the proposed mitigation measures, both from the proposed site investigation works alone and in combination with other plans or projects.
- The Appropriate Assessment is carried out by the competent authority and is supported by the NIS.

The approach taken in preparing the NIS is based on standard methods and guidance as listed in Section 1.6 and the references section of this report.

1.5 LEGISLATIVE CONTEXT

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures to be addressed in the AA process as follows:

- Firstly, a plan / project should aim to avoid any negative impacts on Natura 2000 sites by identifying possible impacts early in the design phase and designing the project / plan to avoid such impacts.
- Secondly, mitigation measures should be applied during the appropriate assessment (Stage 2) process to the point where no adverse impacts on the site(s) remain.
- Thirdly, a plan / project may require an assessment of alternative solutions. Under this stage of the assessment, compensatory measures are required for any remaining adverse effects, but they are permitted only if (a) there are no alternative solutions and (b) the plan / project is required for imperative reasons of overriding public interest (the 'IROPI test'). European case law highlights that consideration must be given to alternatives outside the plan / project boundary area in carrying out the IROPI test.

European Nature Directives (Habitats and Birds)

The Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora) forms the basis for the designation of Special Areas of Conservation (SACs). Similarly, Special Protection Areas (SPAs) are classified under the Birds Directive (Council Directive 2009/147/EEC on the Conservation of Wild Birds). Collectively, SACs and SPAs are referred to as the Natura 2000 network. In general terms, they are considered to be of exceptional importance for rare, endangered, or vulnerable habitats and species within the European Union.

Under Article 6(3) of the Habitats Directive an 'appropriate assessment' must be undertaken for any plan or project that is likely to have a significant effect on the conservation objectives of a Natura 2000 site. An Appropriate Assessment is an evaluation of the potential impacts of a plan or project on the conservation objectives of a Natura 2000 site and the development, where necessary, of mitigation or avoidance measures to preclude negative effects.

Article 6, paragraph 3 of the EC Habitats Directive 92/43/EEC ("the Habitats Directive") states that:

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

European Communities (Birds and Natural Habitats) Regulations 2011

Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011 sets out the circumstances under which an 'Appropriate Assessment' is required. Section 42(1) requires that 'a screening for Appropriate Assessment of a plan or project for which an application for consent is received, or which a public authority wishes to undertake or adopt, 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 plan or project, individually or in combination with other plans or projects, is likely to have a significant effect on the European site.'

Section 42(2) expands on this, stipulating that a public authority must carry out a screening for Appropriate Assessment before consent for a plan or project is given or a decision to undertake or adopt a plan or project is taken. To assist a public authority to discharge its duty in this respect, Section 42(3)(a) gives them the authority to direct a third party to provide a Natura Impact Statement, and Section 42(3)(b) allows them to request any additional information that is considered necessary for the purposes of undertaking a screening. Similarly, Section 177T of the Planning and Development Act 2000, as amended, provides for the competent authority to require the submission of a Natura Impact Statement where necessary to inform an Appropriate Assessment.

A Natura Impact Statement must include such information or data as the public authority considers necessary to enable it to ascertain if the plan or project will affect the integrity of a Natura 2000 site. Where appropriate, a Natura Impact Statement also needs to include:

I. the alternative solutions that have been considered and the reasons why they have not been adopted;
II. the imperative reasons for overriding public interest that are being relied upon to indicate that the plan or project should proceed notwithstanding that it may adversely affect the integrity of a European site; and
III. the compensatory measures that are being proposed.

Section 42(6) requires that 'the public authority shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site'.

The Maritime Area Planning Act 2021

The Maritime Area Planning Act 2021 provides the legislative framework for maritime area consents and the regulation of activities in the maritime area. In the context of this project, the proposed site investigation works are subject to a Maritime Usage Licence (MUL) application to the Maritime Area Regulatory Authority (MARA). Section 117 of the Maritime Area Planning Act 2021 provides for Appropriate Assessment in relation to

proposed maritime area activities and provides the legislative basis for MARA's consideration of the implications of proposed maritime area activities for European Sites.

MARA determined, following its Appropriate Assessment Screening of the proposed site investigation works, that likely significant effects on European Sites could not be excluded and requested the preparation of a Natura Impact Statement pursuant to Section 117(6)(a) of the Maritime Area Planning Act 2021. This NIS has therefore been prepared to provide the information required to support MARA, as the competent authority, in undertaking an Appropriate Assessment of the proposed site investigation works.

1.6 METHODOLOGY AND APPROACH

The NIS has been prepared having regard to the above legislation, guidance and site-specific documentation, together with the following sources:

- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government, 2009; 11 February 2010 revision.
- Commission Notice: Managing Natura 2000 sites – The provisions of Article 6 of the Habitats Directive 92/43/EEC, European Commission, 2018.
- Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, March 2021.
- Relevant site-specific NPWS documentation, including the current Conservation Objectives for the Rockabill to Dalkey Island SAC, Codling Fault Zone SAC and Lambay Island SAC.
- Natura Impact Statements and Appropriate Assessment guidance.
- Article 17 conservation status reports for relevant qualifying interests.
- Water Framework Directive Monitoring Programme guidance documents and hydromorphological assessment methodologies published by the EPA.
- Environmental Good Practice on Site Guide (CIRIA).
- Relevant guidance relating to the prevention of sediment and hydrocarbon release during marine and construction activities.

1.7 MANAGING NATURA 2000 SITES: THE PROVISIONS OF ARTICLE 6 OF THE HABITATS DIRECTIVE 92/43/EEC, EUROPEAN COMMISSION, 2000.

- Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, March 2021.
- Relevant site-specific NPWS documentation including:
    - Conservation Objectives for the Rockabill to Dalkey Island SAC;
    - Conservation Objectives for the Codling Fault Zone SAC;
    - Conservation Objectives for the Lambay Island SAC
    - Natura Impact Statements and Appropriate Assessment guidance;
    - Article 17 conservation status reports for qualifying interests

- Water Framework Directive Monitoring Programme guidance documents and hydromorphological assessment methodologies published by the EPA.
- Control of Water Pollution from Linear Construction Projects (CIRIA C648).
- Environmental Good Practice on Site Guide (CIRIA).
- Water Pollution Acts 1977–1990 (as amended) and associated guidance relating to prevention of sediment and hydrocarbon release during construction activities.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC (European Commission, 2019).

The above legislation, guidance and site-specific documentation have informed the preparation of this NIS, which has been undertaken having regard to the best available scientific knowledge and applicable legislative and policy requirements.

1.8 RIVER BASIN MANAGEMENT PLAN FOR IRELAND 2022–2027 (3RD CYCLE)

The Water Framework Directive (WFD) establishes environmental objectives for the protection, improvement and restoration of surface waters, groundwater and protected areas across Member States. River Basin Management Plans (RBMPs) provide the framework through which these objectives are implemented at national and catchment scale.

Ireland's current RBMP is the River Basin Management Plan 2022–2027, also published as the Water Action Plan 2024. The third-cycle RBMP sets out measures to protect and restore water quality and aquatic ecosystem function throughout Ireland in accordance with the requirements of the WFD. The Plan adopts a catchment-based approach to the management and protection of water resources.

The proposed site investigation works are located within the Dublin Bay coastal waterbody (IE_EA_090_0000). Dublin Bay is classified by the Environmental Protection Agency (EPA) as a coastal waterbody. The most recent available WFD information for the 2019–2024 assessment period identifies Dublin Bay as having 'Good' status. The EPA spatial dataset also identifies Dublin Bay as 'Not at Risk' of failing to meet its WFD objectives for 2027.

The proposed site investigation works will comprise temporary and localised marine and terrestrial boreholes, Cone Penetration Testing (CPT), vibrocore sampling and multibeam bathymetric surveying. The marine investigations have the potential to result in limited and temporary mobilisation of seabed sediments and associated increases in suspended sediment concentrations in the immediate vicinity of the works. No permanent alteration to the coastal waterbody, dredging, reclamation or permanent structures are proposed as part of the site investigation works.

The proposed works will therefore be undertaken using appropriate environmental controls to minimise the potential for sediment mobilisation and accidental pollution and to avoid deterioration in the water quality of

Dublin Bay. Given the temporary and localised nature of the works, no significant effect on the WFD status or environmental objectives of the Dublin Bay coastal waterbody is anticipated.

1.9 LIMITATIONS

This Natura Impact Statement report has been prepared for the sole use of Dún Laoghaire-Rathdown County Council ("the Client"). No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by OCSC.

This assessment is based on a review of available historical information, relevant guidance, site surveys and reports from third parties. All information received has been taken in good faith as being true and representative.

This report has been prepared in line with the best industry standards. The methodology adopted and the sources of information used by OCSC in providing its services are outlined in this Report. The assessment undertaken by OCSC was carried out between August and October 2026 and is based on the information available during that period. The scope of this report and the services are accordingly factually limited by these circumstances.

OCSC disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report which may come or be brought to OCSC's attention after the date of the Report.

The conclusions presented in this report represent OCSC's best professional judgement based on a review of the relevant information available at the time of writing. The opinions and conclusions presented are valid only to the extent that the information provided was accurate and complete.

2 DESCRIPTION OF THE PROPOSED WORKS

2.1 PROJECT DESCRIPTION

Dún Laoghaire-Rathdown County Council (DLRCC) proposes to undertake a programme of marine and coastal site investigation (SI) works within Dún Laoghaire Harbour, Co. Dublin, in connection with the proposed National Watersports Campus. The proposed SI works are required to establish baseline information on seabed conditions, subsurface geology, sediment characteristics and bathymetry to inform the feasibility, design and environmental assessment of potential future infrastructure associated with the National Watersports Campus.

The proposed maritime usage is the subject of Maritime Usage Licence (MUL) application MUL250023 to the Maritime Area Regulatory Authority (MARA). MARA classifies the proposed activity as marine environmental surveys for the purposes of site investigation or in support of a future application under Part XXI of the Planning and Development Act 2000, as amended.

The proposed SI works comprise a combination of geotechnical and bathymetric investigation techniques, including marine boreholes, boreholes located beyond the 2024 High Water Mark, Cone Penetration Testing (CPT), vibrocore sampling and multibeam bathymetric survey. The investigations are temporary in nature and will be undertaken at discrete locations within and adjacent to Dún Laoghaire Harbour. The proposed works do not comprise the construction of the National Watersports Campus itself.

2.2 MUL APPLICATION AREA

The proposed SI works are located within Dún Laoghaire Harbour, Co. Dublin, on the southern side of Dublin Bay. The harbour comprises a series of inner basins, piers, breakwaters and marine facilities and supports a range of existing uses including recreational sailing, rowing and other watersports, leisure craft, commercial marine activity and emergency marine services.

The MUL application area comprises a number of discrete areas associated with the proposed SI activities. These include locations within the marine environment of the harbour and areas within which site investigation activities are proposed to support the assessment and design of potential future National Watersports Campus infrastructure. The extent and configuration of the MUL application area, together with the proposed SI locations, are presented in Figure 1.2.

The application area occurs within the Dublin Bay coastal waterbody, which forms part of the wider Irish Sea coastal environment. The location is also ecologically sensitive due to its proximity to European sites, including the Rockabill to Dalkey Island SAC, Codling Fault Zone SAC and Lambay Island SAC. These ecological relationships and the potential pathways between the proposed activities and the relevant Qualifying Interests of these European sites are considered in detail within the subsequent sections of this NIS. The MUL

application relates specifically to the proposed site investigation activities and does not provide consent for the construction or operation of the future National Watersports Campus.

2.3 SITE INVESTIGATION ACTIVITIES

The proposed SI programme comprises a suite of geotechnical and bathymetric investigations designed to provide information on the physical characteristics of the seabed and underlying geological conditions within the study area. The proposed activities comprise borehole drilling, CPT, vibrocore sampling and multibeam bathymetric surveying. The individual investigation techniques are described below.

2.4 MARINE BOREHOLES

Marine boreholes will be undertaken at selected locations within the MUL application area to establish subsurface ground conditions and determine the nature, thickness and engineering characteristics of the underlying sediments and bedrock.

The marine boreholes will be undertaken using either sonic drilling or cable percussion drilling, depending on the ground conditions encountered and the requirements of the investigation. Following penetration of superficial deposits, rotary core drilling will be undertaken where required, extending approximately 3 m into competent bedrock, where encountered. This methodology will allow the underlying stratigraphy, depth to rock and relevant geotechnical parameters to be established.

The works will result in temporary and highly localised disturbance at individual borehole locations. The boreholes are investigative features only and no permanent structures will be installed as part of these works. Material recovered during drilling will be retained for examination and, where required, laboratory testing to inform subsequent engineering design.

2.5 BOREHOLES BEYOND THE HIGH-WATER MARK

Additional boreholes are proposed at locations beyond the 2024 High Water Mark to supplement the information obtained from the marine investigations and provide continuity of geotechnical information between the marine and terrestrial environments. These boreholes will be undertaken using the same general methodology as the marine boreholes, comprising sonic drilling or cable percussion drilling through superficial deposits, followed, where required, by rotary core drilling into bedrock.

The investigations will provide information on subsurface stratigraphy, depth to bedrock and geotechnical characteristics at locations associated with potential future landside and coastal infrastructure. The boreholes will be temporary investigation points only and will be appropriately reinstated following completion of the investigations.

2.6 CONE PENETRATION TESTING

Cone Penetration Testing (CPT) will be undertaken at selected locations to provide detailed in situ information on the engineering properties of unconsolidated seabed and subsurface sediments.

CPT is an in-situ investigation technique whereby an instrumented cone is advanced vertically through the underlying sediments. Measurements obtained during penetration allow the strength and deformation characteristics of the soils to be characterised and provide information on changes in subsurface stratigraphy.

The results of the CPT investigations will complement information obtained from the borehole and vibrocore investigations and will assist in characterising subsurface conditions and informing foundation and engineering design assumptions for potential future marine infrastructure.

CPT does not involve bulk excavation or dredging, and disturbance of seabed material will be confined to the immediate footprint of each investigation location.

2.7 VIBROCORE SAMPLING

Vibrocore sampling will be undertaken at selected locations within the MUL application area to recover sediment cores from the seabed for subsequent examination and laboratory analysis.

Vibrocore sampling involves the penetration of a sampling tube into unconsolidated seabed sediments using vibration. Once the required penetration depth has been achieved, the core barrel is recovered, allowing a continuous or near-continuous sample of the shallow seabed sediments to be obtained.

The recovered material will be used to characterise sediment composition and, where relevant, undertake environmental and geotechnical laboratory testing. This information will assist in establishing the nature and properties of the shallow seabed sediments and inform the design and environmental assessment of potential future works.

Vibrocore sampling will result in a small and temporary area of seabed disturbance at each sampling location. No dredging or bulk removal of seabed material is proposed. Any disturbance of sediment associated with deployment and recovery of the vibrocore will therefore be highly localised and temporary.

Recovered sediment cores will be retained for visual logging and relevant laboratory testing. All recovered material and waste generated during sampling will be appropriately contained and managed and will not be discharged to the marine environment.

2.8 MULTIBEAM BATHYMETRIC SURVEY

A multibeam bathymetric survey will be undertaken within the relevant MUL application area to obtain high-resolution information on seabed levels and morphology.

The survey will be undertaken using a multibeam echosounder (MBES). The system emits acoustic signals towards the seabed and records the returning signals to determine water depth across a swath beneath the survey vessel. Successive survey lines allow a detailed three-dimensional representation of the seabed to be produced.

The resulting bathymetric information will provide detailed data on seabed morphology, water depths and existing seabed features and will support the engineering design and environmental assessment of potential future infrastructure.

The multibeam survey is non-intrusive and will not require physical penetration, excavation or removal of seabed material. The principal activity associated with the survey will therefore comprise the movement of the survey vessel through the survey area and the operation of the acoustic survey equipment. The potential for underwater sound generated by the survey equipment to interact with sensitive marine fauna is considered separately within the relevant ecological assessment sections of this NIS.

2.9 MARINE PLANT AND VESSEL REQUIREMENTS

The proposed marine site investigation works will require the use of suitable marine plant and survey vessels to facilitate access to the investigation locations within Dún Laoghaire Harbour. The type of vessel or marine platform used will be appropriate to the individual investigation technique, prevailing water depths, tidal conditions and navigational requirements within the harbour.

Marine borehole drilling, Cone Penetration Testing (CPT) and vibrocore sampling will be undertaken using suitably equipped marine plant capable of safely deploying and recovering the required investigation equipment. The multibeam bathymetric survey will be undertaken from a suitable survey vessel operating along predetermined survey lines within the relevant MUL application area.

Marine plant will be positioned only for the period necessary to complete the investigation at each location before relocating to the next investigation point. Vessel movements associated with the SI works will therefore be temporary and intermittent and will occur within the existing operational environment of Dún Laoghaire Harbour, which is characterised by regular recreational, commercial and other marine vessel activity.

All vessels and marine plant used during the works will comply with relevant navigational, marine safety and pollution prevention requirements. The final selection of marine plant will be subject to the appointed contractor's detailed methodology and will remain within the scope and parameters of the activities assessed within this NIS and the associated MUL application.

2.10 MOBILISATION AND DEMOBILISATION

Marine plant, vessels and investigation equipment will be mobilised to Dún Laoghaire Harbour prior to commencement of the relevant SI activities. Mobilisation will include the transport and preparation of the equipment required for borehole drilling, CPT, vibrocore sampling and multibeam bathymetric surveying.

Following mobilisation, marine plant will proceed to the predetermined investigation locations within the MUL application area. Equipment will be deployed only within the defined investigation areas and will remain at individual locations for the period required to complete the relevant investigation. Following completion, equipment will be recovered, and the vessel or marine plant will relocate to the next investigation location as required.

Upon completion of the SI programme, all temporary investigation equipment, marine plant and associated materials will be removed from the works areas. No permanent marine infrastructure will be installed as part of the proposed SI works.

Mobilisation and demobilisation activities will be undertaken in accordance with applicable marine safety, navigation and environmental requirements and will be managed to minimise unnecessary vessel movements and disturbance within the harbour.

2.11 PROGRAMME, WORKING HOURS AND DURATION

The proposed SI works will be undertaken over a temporary investigation period of up to 12 weeks, subject to suitable weather, tidal conditions and operational requirements. Individual intrusive investigations will occur sequentially at discrete locations rather than simultaneously throughout the entire MUL application area.

Marine plant and survey vessels will mobilise to individual investigation locations as required and will relocate following completion of each investigation.

The works will generally be undertaken during daylight hours. Where activities are required during hours of darkness, task lighting will be restricted to the immediate working area and directed away from adjacent marine and coastal habitats insofar as practicable. The programme will remain subject to weather and tidal conditions and may therefore vary within the overall licence period.

2.12 REINSTATEMENT

The proposed SI works are investigative and temporary in nature and will not involve the construction of permanent structures within the maritime area. Following completion of each investigation, equipment will be recovered, and the investigation location will be left in a safe and stable condition.

The marine boreholes, CPT locations and vibrocore sampling points will result in only discrete, localised penetration of the seabed. No dredging or bulk excavation of marine sediments is proposed as part of the SI programme. Disturbance associated with these activities will therefore be confined to the immediate vicinity of the investigation locations. The SI programme is designed to provide the information required to characterise the seabed and subsurface conditions within the survey area.

Any boreholes undertaken beyond the High-Water Mark will be appropriately closed and the investigation locations reinstated following completion of the works, in accordance with the agreed SI methodology and any

applicable requirements. All temporary equipment, materials and waste generated by the investigations will be removed from the works areas following completion. No waste materials or investigation equipment will be intentionally left within the marine environment.

The multibeam bathymetric survey is non-intrusive and does not require physical penetration or excavation of the seabed: consequently, no physical reinstatement will be required following completion of this element of the survey.

2.13 SITE LOCATION

The proposed site investigation works are located within and adjacent to Dún Laoghaire Harbour, Dún Laoghaire, Co. Dublin, in the southern part of Dublin Bay. The harbour is located adjacent to the N31 and comprises a number of inner basins formed by piers and breakwaters, including the Old Harbour, Coal Harbour and Marina Harbour. The harbour entrance is broadly aligned to the north-northeast and measures over 230 m across.

Dún Laoghaire Harbour is situated within an urban and marine setting and supports a range of existing marine and recreational uses. These include a large leisure marina, sailing and yacht clubs, rowing and watersports activities, commercial marine services, and emergency maritime services including RNLI lifeboats and Irish Coast Guard operations. The harbour historically functioned as a major passenger ferry port but has subsequently evolved into a marine and recreational hub.

The proposed site investigation works comprise temporary marine and coastal investigations within the defined Maritime Usage Licence (MUL) application area. The works will occur at discrete locations within and adjacent to the harbour, including intertidal and subtidal areas. The investigation programme includes marine and terrestrial boreholes, Cone Penetration Testing (CPT), vibrocore sampling and multibeam bathymetric surveying. The locations of the proposed site investigation works are shown in Figure 1.2.

2.14 HYDROLOGY

The proposed site investigation works are located within the Dublin Bay coastal waterbody (IE_EA_090_0000). Dublin Bay is classified as a coastal waterbody by the Environmental Protection Agency (EPA) and forms part of the wider Irish Sea coastal environment. See Figure 2.1 and Figure 2.2 for waterbody locations.

Based on the most recent available water quality information for the 2019–2024 assessment period, Dublin Bay has an overall Water Framework Directive (WFD) status of 'Good', as shown in Figure 2.1.

The EPA spatial dataset indicates that Dublin Bay (IE_EA_090_0000) is 'Not at Risk' of failing to meet its WFD objectives by 2027 (EPA, 2025), as shown in Figure 2.2. WFD information for the Dublin Bay coastal waterbody is summarised in Table 2.1.

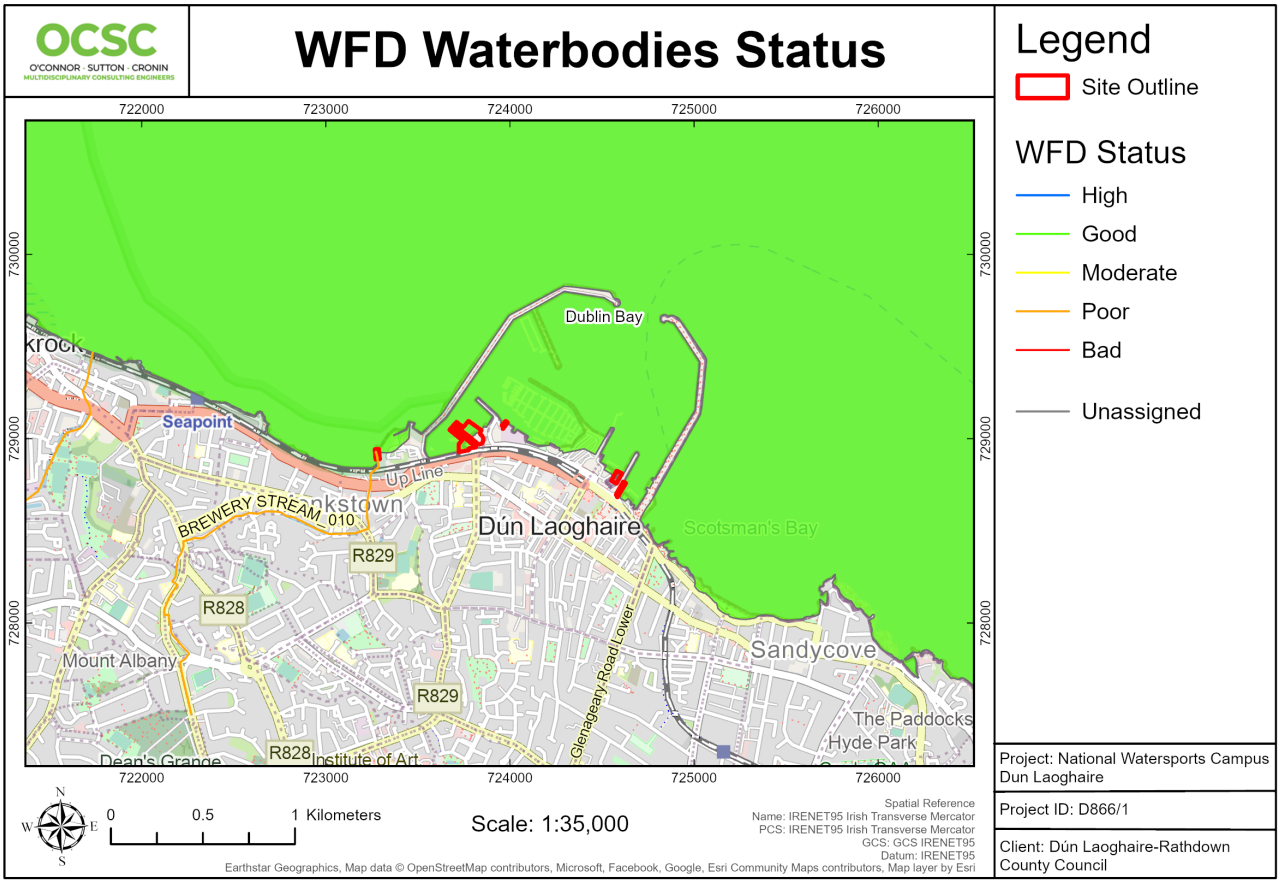


Figure 2.1: WFD Waterbodies Status (Source: OCSC, 2026)

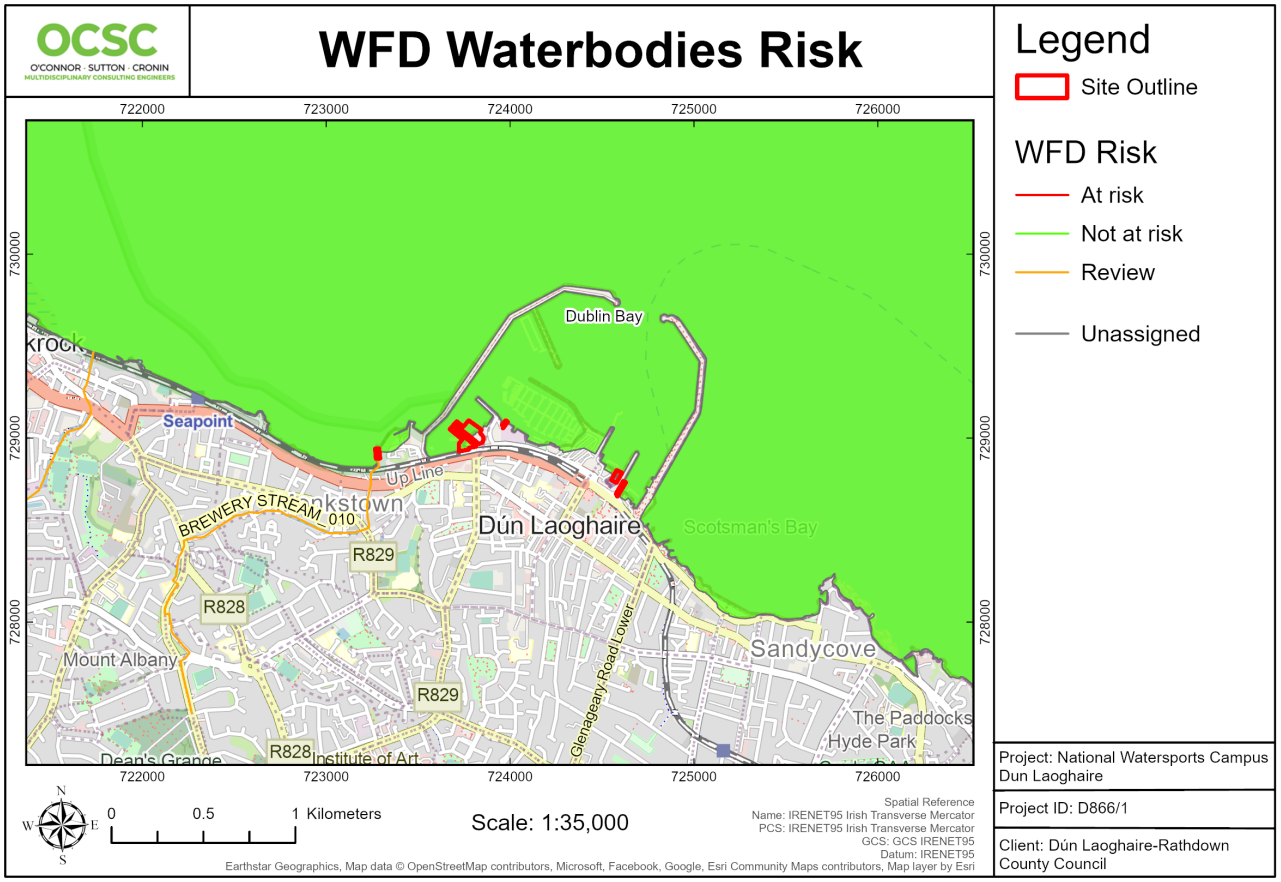


Figure 2.2: WFD Waterbodies Risk (Source: OCSC, 2026)

Table 2.1: WFD Summary Information

WFD Summary Information	
Name	Dublin Bay
Waterbody Code	IE_EA_090_0000
Waterbody Type	Coastal
Iteration	SW 2019-2024
Status	Good
Risk	Not at Risk

3 RELATIONSHIP TO DESIGNATED SITES

3.1 ZONE OF INFLUENCE

The Zone of Influence (ZoI) of a project is the geographical area over which ecological effects arising from the proposed project may occur and is determined having regard to the nature, scale and location of the proposed works, the sensitivities of relevant ecological receptors and the presence of credible source-pathway-receptor relationships. In accordance with relevant Appropriate Assessment guidance, the ZoI is therefore determined on a case-by-case basis and is not defined solely by a fixed geographical distance.

Following submission of the MUL application and supporting environmental documentation, MARA completed Appropriate Assessment Screening for the proposed maritime usage. MARA's Appropriate Assessment Screening and Determination Report, dated 4th August 2026, concluded that Stage 2 Appropriate Assessment is required as it could not be excluded, on the basis of objective scientific information, that the proposed maritime usage, either individually or in combination with other plans or projects, would have a significant effect on a European Site.

In undertaking its screening assessment, MARA considered European Sites having regard to the nature, scale and ZoI of the proposed maritime usage, their conservation objectives and relevant source-pathway-receptor relationships. The assessment identified underwater noise disturbance and displacement associated with the proposed intrusive geotechnical investigations as the principal pathway requiring further assessment at Stage 2. MARA considered that underwater sound generated by these activities has the potential to affect the site-specific conservation objectives of relevant marine mammal Qualifying Interests, having regard to the operating parameters, location and scale of the investigations.

On this basis, MARA identified the following European Sites and Qualifying Interests for further consideration at Stage 2 Appropriate Assessment:

- **Rockabill to Dalkey Island SAC (003000)** located approximately 2.7km from the MUL application area, in respect of Harbour Porpoise (*Phocoena phocoena*) [1351]
- **Codling Fault Zone SAC (003015)** located approximately 29.8km from the MUL application area, in respect of Harbour Porpoise (*Phocoena phocoena*) [1351]
- **Lambay Island SAC (000204)** located approximately 21.7km from the MUL application area, in respect of Harbour Porpoise (*Phocoena phocoena*) [1351], Grey Seal (*Halichoerus grypus*) [1364] and Harbour Seal (*Phoca vitulina*) [1365].

MARA identified potential underwater noise disturbance and displacement associated with the proposed site investigation works as the relevant source-pathway-receptor relationship for the marine mammal Qualifying Interests identified for Stage 2 Appropriate Assessment.

The Stage 2 assessment presented in this NIS therefore focuses on the European Sites and Qualifying Interests identified by MARA as requiring further assessment, namely Rockabill to Dalkey Island SAC

[003000], Codling Fault Zone SAC [003015] and Lambay Island SAC [000204]. The assessment focuses on the potential effects of underwater noise disturbance and displacement on Harbour Porpoise [1351] associated with all three SACs, and Grey Seal [1364] and Harbour Seal [1365] associated with Lambay Island SAC.

The assessment also considers potential in-combination effects. MARA identified a number of projects with potential spatial and temporal overlap with the proposed maritime usage and concluded that in-combination underwater-noise effects on the relevant marine mammal Qualifying Interests could not be excluded at screening stage. The potential for in-combination effects is therefore considered further in Section 5.6.

The assessment of potential effects on the relevant Qualifying Interests is presented in the following sections, with particular focus on underwater noise disturbance and displacement arising from the proposed site investigation works.

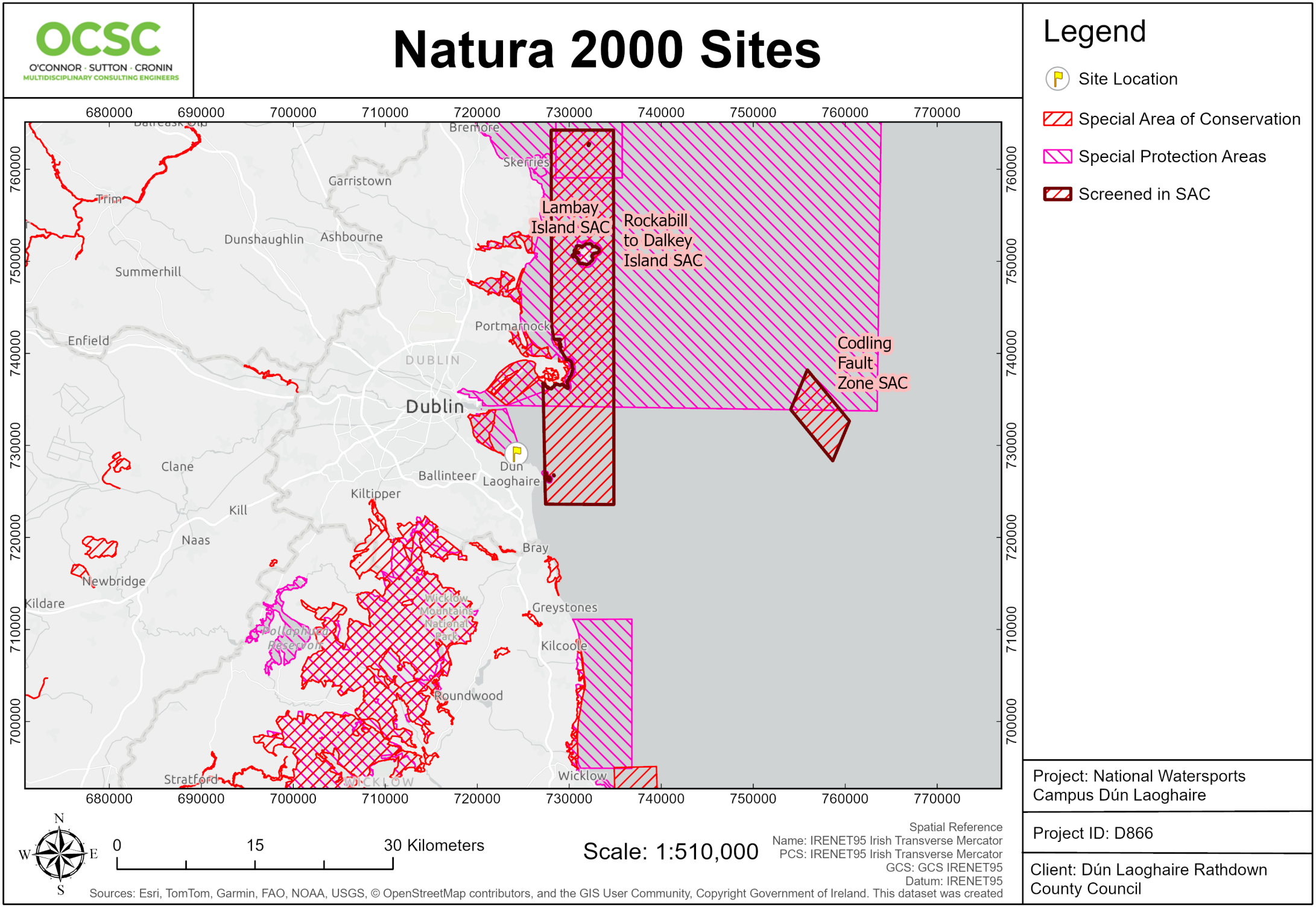


Figure 3.1: Natura 2000 Sites (Source: OCSC, 2026)

Table 3.1: European Sites Considered Further in this NIS within the Zone of Influence.

Site Code	Site Name	Distance (km)	Sensitive Receptors	Site Details
003000	Rockabill to Dalkey Island SAC	2.7 N	[1170] Reefs [1351] Harbour Porpoise (*Phocoena phocoena)*	The conservation objectives of the site are (NPWS: 07/05/13): "To maintain the favourable conservation condition of Reefs" "To maintain the favourable conservation condition of Harbour Porpoise" Available at: **https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO003000.pdf**
003015	Codling Fault Zone SAC	29.8 E	[1180] Submarine structures made by leaking gases [1351] Harbour Porpoise (*Phocoena phocoena)*	The conservation objectives of the site are (NPWS: 14/01/25): "To maintain the favourable conservation condition of Submarine structures made by leaking gases" "To maintain the favourable conservation condition of Harbour Porpoise" Available at: **https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO003015.pdf**
000204	Lambay Island SAC	21.7 N	[1170] Reefs [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts 1351] Harbour Porpoise (*Phocoena phocoena*) [1364] Grey Seal (*Halichoerus grypus*) [1365] Harbour Seal (*Phoca vitulina)*	The conservation objectives of the site are (NPWS: 17/12/24): "To maintain the favourable conservation condition of Reefs" "To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts" "To maintain the favourable conservation condition of Harbour Porpoise" "To maintain the favourable conservation condition of Grey Seal" "To maintain the favourable conservation condition of Harbour Seal" Available at: **https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000204.pdf**

3.2 DESCRIPTION OF THE NATURA 2000 SITES

The Habitats Directive states, "*Any plan or project not directly connected 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 conservation objectives…the competent national authorities shall agree to the plan or project only having ascertained that it will not adversely affect the integrity of the site*…"

The conservation objectives form the basis of the Appropriate Assessment as it is against these objectives that the assessment is made. The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives, and SACs and SPAs are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network. European and national legislation places a collective obligation in Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation conditions will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Favourable conservation status of a habitat is achieved when:

- Its natural range and the 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 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 range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
    - there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The European Sites considered further in this NIS are Rockabill to Dalkey Island SAC (003000), Codling Fault Zone SAC (003015) and Lambay Island SAC (000204). The relevant Qualifying Interests identified by MARA for Stage 2 Appropriate Assessment are Harbour Porpoise [1351] for all three SACs, together with Grey Seal [1364] and Harbour Seal [1365] for Lambay Island SAC. The assessment is undertaken having regard to the conservation objectives and relevant attributes and targets for these Qualifying Interests.

3.3 SUMMARY OF MARA APPROPRIATE ASSESSMENT SCREENING

Following submission of the MUL application and supporting environmental documentation, the Maritime Area Regulatory Authority (MARA), acting as the competent authority, undertook its own Screening for Appropriate Assessment of the proposed maritime usage. Subsequent to the conclusion reached in OCSC's AA Screening Report, MARA determined that the possibility of likely significant effects on relevant European sites could not be excluded on the basis of objective scientific information at the screening stage. MARA therefore determined that the proposed maritime usage should progress to Stage 2 Appropriate Assessment.
Consequently, MARA issued a notice pursuant to Section 117(6)(a) of the Maritime Area Planning Act 2021, requesting the applicant to submit a Natura Impact Statement (NIS) containing the information necessary to enable MARA to undertake an Appropriate Assessment of the proposed maritime usage. MARA's request specifically requests a *Natura Impact Statement (NIS) for the sites and impacts listed in MARA's Appropriate Assessment Screening and Determination Report only (i.e. underwater noise and marine mammals)*.

The European Sites considered in this NIS are:

- Rockabill to Dalkey Island SAC (003000)
- Codling Fault Zone SAC (003015)
- Lambay Island SAC (000204)

This NIS has therefore been prepared in response to MARA's determination and subsequent request. The purpose of the NIS is to provide the scientific information required to enable MARA to assess the implications of the proposed SI works for the relevant European sites, in view of their conservation objectives, and to determine whether the proposed maritime usage, either alone or in combination with other plans or projects, would adversely affect the integrity of any European site.

3.4 EUROPEAN SITES REQUIRING STAGE 2 APPROPRIATE ASSESSMENT

Having regard to the outcome of the screening process and the potential source-pathway-receptor relationships between the proposed site investigation (SI) works and the relevant European Sites, the Stage 2 assessment presented within this NIS focuses on the European Sites and Qualifying Interests for which potential effects could not be excluded at the screening stage.

MARA's Appropriate Assessment Screening and Determination identified the following European Sites as requiring further assessment at Stage 2:

- Rockabill to Dalkey Island SAC (003000),
- Codling Fault Zone SAC (003015),
- Lambay Island SAC (000204).

For Rockabill to Dalkey Island SAC, located 2.7 km from the proposed MUL application area, MARA identified a potential source-pathway-receptor relationship between underwater noise generated by the proposed SI

works and the Harbour Porpoise *(Phocoena phocoena*) [1351]. Accordingly, Harbour Porpoise is considered further within this NIS in view of the conservation objectives of the SAC.

Codling Fault Zone SAC is located 29.8 km from the proposed MUL application area. Despite the separation distance, Harbour Porpoise is a mobile marine species, and MARA identified a potential pathway for underwater noise associated with the proposed SI activities to affect Harbour Porpoise, requiring further consideration at Stage 2.

Lambay Island SAC is located 21.7 km from the proposed MUL application area. MARA identified potential underwater noise effects in relation to the marine mammals Qualifying Interests of the SAC, namely Harbour Porpoise, Grey Seal (*Halichoerus grypus*) [1364], and Harbour Seal (*Phoca vitulina*) [1365]. These Qualifying Interests are therefore considered further within the Stage 2 assessment.

The impact pathway requiring further examination is underwater noise disturbance and displacement associated with the proposed SI activities. MARA considers that underwater sound generated by the intrusive geotechnical investigations has the potential to occur at levels capable of affecting the site-specific conservation objectives of the relevant Qualifying Interests, having regard to the location and scale of the works.

Potential effects are considered both from the proposed maritime usage alone and in combination with other plans and projects. MARA identified potential spatial and temporal overlap with other maritime activities and concluded that potential in-combination underwater noise effects on Harbour Porpoise, Grey Seal and Harbour Seal could not be excluded at the screening stage.

The conservation objectives and complete lists of Qualifying Interests for these European Sites are presented in Table 3.1 and described further in Section 4 of this NIS. The detailed Stage 2 assessment focuses on the Qualifying Interests and impact pathways identified through the screening process as requiring further examination.

3.5 POTENTIAL IMPACT PATHWAYS IDENTIFIED FOR FURTHER ASSESSMENT

The Stage 1 AA Screening considered a range of potential impact pathways associated with the proposed SI activities. Although the assessment concluded that these pathways would not result in likely significant effects, MARA's subsequent screening determination concluded that likely significant effects could not be excluded and requested that a Stage 2 Appropriate Assessment be undertaken.

Accordingly, and adopting a precautionary approach, the following potential impact pathway is considered further within this NIS:

3.5.1 UNDERWATER NOISE

The proposed SI works will generate underwater sound associated with marine borehole drilling, Cone Penetration Testing (CPT), vibrocore sampling, multibeam bathymetric surveying (MBES) and vessel operations. MARA identified the potential for underwater sound generated by the geotechnical investigations to result in disturbance and displacement of the relevant marine mammal Qualifying Interests, having regard to the operating parameters, location and scale of the proposed SI works.

Accordingly, the potential effects of underwater noise are considered further in this NIS in relation to Harbour Porpoise (*Phocoena phocoena*) associated with Rockabill to Dalkey Island SAC, Codling Fault Zone SAC and Lambay Island SAC, and Grey Seal (*Halichoerus grypus)* and Harbour Seal (*Phoca vitulina*) associated with Lambay Island SAC.

The assessment considers the potential for underwater noise to result in auditory injury, temporary changes in hearing sensitivity, behavioural disturbance and/or displacement, as relevant to the characteristics of the proposed sound sources and the sensitivities of the marine mammal QIs. The assessment is undertaken with reference to the project-specific underwater noise information prepared for the proposed SI works and the conservation objectives, and where relevant the associated attributes and targets, of the relevant European Sites.

Potential effects are assessed both from the proposed maritime usage alone and in combination with other plans and projects. MARA identified a number of projects with potential spatial and/or temporal overlap and concluded that potential in-combination underwater noise effects on the relevant marine mammal QIs could not be excluded at the screening stage.

Other potential pathways considered during MARA's screening assessment, including airborne noise and visual disturbance and physical disturbance, turbidity and siltation, were not identified as giving rise to likely significant effects requiring further Stage 2 assessment and are therefore not considered further in detail within this report.

4 EUROPEAN SITES REQUIRING APPROPRIATE ASSESSMENT

4.1 ROCKABILL TO DALKEY ISLAND SAC

4.1.1 OVERVIEW

Rockabill to Dalkey Island SAC (003000) comprises an extensive area of inshore and coastal waters in the western Irish Sea. The site extends southwards from Rockabill, adjacent to Howth Head and across Dublin Bay to Frazer Bank in South County Dublin, and encompasses Rockabill, Dalkey and Muglins islands. The SAC contains a range of marine habitats, including sandy and muddy seabed, sandbanks, rock reefs and shallow inshore waters.

The SAC is designated for two Qualifying Interests: Reefs [1170] and Harbour Porpoise (*Phocoena phocoena)* [1351]. Reef habitat within the SAC occurs in both intertidal and subtidal areas and supports diverse marine communities. NPWS identifies the site as containing an important reef resource within the Irish Sea including reef habitat associated with the offshore island along the Dublin coast.

The SAC is also an important area for Harbour Porpoise within the Irish Sea. NPWS information indicates that the Harbour Porpoise occurs within the site throughout the year, with a high group size recorded and observations of adults accompanied by calves.

The proposed SI works are located approximately 2.7 km from the SAC at their closest point. There is no direct spatial overlap between the proposed maritime usage and the SAC, accordingly, no direct loss or physical disturbance of Reefs [1170] will occur.

A full site synopsis for the SAC is included in Appendix A of this report.

4.1.2 CONSERVATION OBJECTIVES

The EU Habitats Directive contains a list of habitats under Annex I and species under Annex II for which SACs must be established by Member States. Habitats and species for which a European Site is designated are referred to as qualifying interests and are listed in the Standard Data Forms submitted by Member States to the European Commission.

The site-specific conservation objectives for Rockabill to Dalkey Island SAC were published by the NPWS in May 2013. The SAC is designated for Reefs [1170] and Harbour Porpoise [1351], with the conservation objectives for both Qualifying Interests being to maintain their favourable conservation condition.

For Reefs [1170], favourable conservation condition is defined through attributes and targets relating to habitat distribution, habitat area and community structure. For Harbour Porpoise [1351], favourable conservation condition is defined through attributes and targets relating to access to suitable habitat and disturbance.

The Harbour Porpoise conservation objective is relevant to this assessment, given the underwater-noise pathway identified during the screening stage. The Stage 2 assessment therefore considers whether underwater noise associated with the proposed SI works could interfere with Harbour Porpoise access to suitable habitat or result in disturbance.

The Qualifying Interests, conservation objectives and relevant attributes and targets for Rockabill to Dalkey Island SAC are presented in Table 4.1.

Table 4.1: Rockabill to Dalkey Island SAC, Qualifying Interest – Conservation Objectives Status

Code	Qualifying Interest	Conservation Objective
1170	Reefs	To maintain the favourable conservation condition of Reefs in the SAC. The conservation objective is defined by attributes and targets relating to habitat area, distribution and community structure.
1351	Harbour Porpoise (*Phocoena phocoena*)	To maintain the favourable conservation condition of Harbour Porpoise in the SAC. The conservation objective is defined by attributes and targets relating to access to suitable habitat and disturbance.

4.1.2.1 REEFS

Reefs [1170] are a Qualifying Interest of the SAC, with a site-specific conservation objective to maintain their favourable conservation condition. The proposed SI works are located outside the SAC, with the closets proposed activity located approximately 2.7 km from the SAC boundary. Consequently, there will be no direct loss, removal or physical disturbance of reef habitat within the SAC as a result of the proposed maritime usage.

MARA's Appropriate Assessment Screening considered potential effects associated with physical disturbance of habitats and species, including effects arising from seabed disturbance, turbidity, and siltation. Significant effects through these pathways were considered unlikely, having regard to the small and discrete footprint of the proposed investigations, the limited duration of the activities and the localised nature of any sediment disturbances. Reefs were, therefore, not identified as a Qualifying Interest requiring further assessment.

4.1.3 QUALIFYING INTERESTS RELEVANT TO THE PROPOSED SI WORKS

4.1.3.1 HARBOUR PORPOISE

The Harbour Porpoise (*Phocoena phocoena*) [1351] is a Qualifying Interest of the Rockabill to Dalkey Island SAC and is the QI of the SAC identified by MARA as requiring further consideration at Stage 2 Appropriate Assessment in relation to the proposed SI works.

The Harbour Porpoise is widely distributed in Irish coastal and offshore waters and occurs throughout the Rockabill to Dalkey Island SAC. The SAC is an extensive area of marine habitat extending from the Rockabill southwards towards Dalkey Island and includes shallow inshore waters, sand and mudbanks and reef habitats. The NPWS identifies these waters as important habitat for Harbour Porpoise.

Dedicated Harbour Porpoise surveys have been undertaken within Rockabill to Dalkey Island SAC. Surveys undertaken is 2016 comprised four single-platform line-transect surveys between June and September, during which approximately 506 km of survey track was completed. A total of 152 Harbour Porpoise sightings comprising at least 246 individuals were recorded.

The 2016 survey estimated a density of about 1.55 Harbour Porpoise per km^2, corresponding to an estimated abundance of approximately 424 individuals within Rockabill to Dalkey Island SAC. Calves were also recorded during the surveys. Early dedicated surveys undertaken in 2013 produced a comparable density estimate of approximately 1.44 individuals per km^2, indicating consistent use of the SAC by the species. A more recent NPWS dataset included a dedicated 2021 Harbour Porpoise survey of Rockabill to Dalkey Island SAC, demonstrating continued targeted monitoring of the species within the designated site.

The site-specific conservation objectives for Harbour Porpoise are to maintain the favourable conservation condition of the species within the SAC. This is defined through attributes and targets relating to access to suitable habitat and disturbance. These attributes are particularly relevant to the present assessment given the potential for underwater noise generated by the proposed SI activities to result in temporary behavioural disturbance or displacement.

4.1.3.2 RELEVANCE TO THE PROPOSED SI WORKS

The proposed SI works are located approximately 2.7 km from the SAC at their closest point and do not directly overlap the designated site. Accordingly, there will be no direct loss or physical disturbance of habitat within the SAC.

However, Harbour Porpoise is a highly mobile marine species and is not confined to the boundaries of the SAC. Individuals associated with the SAC may therefore occur in water surrounding Dún Laoghaire and the proposed SI works. The proposed activities include marine borehole drilling, Cone Penetration Testing (CPT), vibrocore sampling and multibeam bathymetric surveying (MBES), together with as sociated vessel operations. These activities will generate underwater sound of varying duration.

MARA's Appropriate Assessment Screening identified underwater noise associated with the proposed SI activities as a potential source-pathway-receptor relationship with Harbour Porpoise and concluded that potential significant effects could not be excluded at screening stage. The potential effects of underwater noise on Harbour Porpoise are therefore assessed further within this NIS with particular regard to the conservation objectives of access to suitable habitat and disturbance.

The Stage 2 assessment considers the potential for underwater sound associated with the proposed SI activities to result in auditory effects, behavioural disturbance and/or temporary displacement, having regard to the characteristics and duration of the proposed activities, predicted underwater-noise exposure, the mobility and ecology of the Harbour Porpoise and the availability of suitable marine habitat. Potential effects are

considered from both the proposed maritime usage alone and in combination with other relevant plans and projects.

4.1.4 GUIDANCE AND SUPPORTING INFORMATION

- NPWS (2013), Conservation Objectives: Rockabill to Dalkey Island SAC 003000, Version 1
- NPWS, Rockabill to Dalkey Island SAC Site Synopsis
- NPWS (2013), Rockabill to Dalkey Island SAC (003000) Conservation Objectives Supporting Document – Marine Habitats
- O'Brien, J. and Berrow, S. (2016), Harbour Porpoise Surveys in Rockabill to Dalkey Island SAC, 2016
- NPWS Harbour Porpoise monitoring data, including surveys undertaken within Rockabill to Dalkey Island SAC
- MARA Appropriate Assessment Screening and Determination for the proposed maritime usage
- Department of Arts, Heritage and the Gaeltacht (2014), Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters

4.2 CODLING FAULT ZONE SAC

4.2.1 OVERVIEW

Codling Fault Zone SAC (003015) is located approximately 29.8 km from the proposed Maritime Usage Licence (MUL) application area. The SAC is designated for two Qualifying Interests: Submarine structures made by leaking gases [1180] and Harbour Porpoise (*Phocoena phocoena*) [1351]. MARA identified Harbour Porpoise as the only Qualifying Interest requiring further consideration at Stage 2 Appropriate Assessment.

The potential source-pathway-receptor relationship identified by MARA relates to underwater noise generated by the proposed site investigation works and the potential for disturbance and displacement of Harbour Porpoise.

The proposed SI works are located approximately 29.8 km from the Codling Fault Zone SAC and there is no direct spatial overlap between the proposed works and the SAC. Consequently, no direct loss or physical disturbance of the Submarine structures made by leaking gases [1180] Qualifying Interest is anticipated. This Qualifying Interest is therefore not considered further within this NIS. The assessment of Codling Fault Zone SAC therefore focuses on Harbour Porpoise [1351] and the potential effects of underwater noise generated by the proposed intrusive site investigation activities.

A full site synopsis for the SAC is included in Appendix B of this report.

4.2.2 CONSERVATION OBJECTIVES

The site-specific conservation objectives for Harbour Porpoise (*Phocoena phocoena*) [1351] within Codling Fault Zone SAC are to maintain the favourable conservation condition of the species. Harbour Porpoise is a

highly mobile marine mammal, and individuals may occur beyond the physical boundaries of the SAC or other European Sites designated for their protection. The conservation objective is therefore relevant to the assessment of potential underwater noise effects arising from the proposed SI works.

MARA identified underwater noise associated with the proposed SI works as having a potential impact on Harbour Porpoise. The potential effects considered in this NIS therefore relate primarily to underwater noise disturbance and displacement at a level that could adversely affect the conservation objective of the SAC.

Table 4.2: Codling Fault Zone SAC Qualifying Interests – Conservation Objectives Status

Code	Qualifying Interest	Conservation Objective	Principal CO considerations relevant to SI works
1351	Harbour Porpoise (*Phocoena phocoena*)	Maintain favourable conservation condition	Potential disturbance or displacement arising from underwater noise associated with the proposed intrusive site investigation activities.

Previous environmental assessments undertaken within Dún Laoghaire Harbour have considered the potential for marine activities within the harbour to interact with the wider Dublin Bay marine environment. However, the proposed SI works are substantially smaller in scale and duration than major dredging and marine construction activities previously assessed within the harbour. MARA's screening assessment considered the potential for physical disturbance, turbidity and siltation arising from the proposed SI works and concluded that these pathways were unlikely to result in significant effects on the conservation objectives of the relevant European Sites. The assessment therefore focuses on the underwater noise pathway identified by MARA as requiring further consideration at Stage 2.

4.2.3 QUALIFYING INTEREST HABITATS RELEVANT TO THE PROPOSED SI WORKS

The potential relevance of the QI species to the proposed SI works has been considered with reference to its ecological characteristics, known distribution within the Irish Sea, applicable conservation-objective attributes and targets, and the spatial and hydrological relationship between the SAC and Dún Laoghaire Harbour.

4.2.3.1 HARBOUR PORPOISE

The potential effects of underwater noise on Harbour Porpoise are considered in Section 5 of this NIS, having regard to the nature, scale and duration of the proposed SI works, the characteristics of the relevant sound sources and the conservation objective for Harbour Porpoise within the SAC.

As the proposed SI works do not overlap the SAC, there will be no direct removal of QI habitat. The principal consideration is therefore whether indirect pathways arising from the proposed marine works could result in effects on Harbour Porpoise capable of affecting the conservation objective of the SAC.

4.2.4 RELEVANCE TO THE PROPOSED SI WORKS

The Codling Fault Zone SAC is located approximately 29.8 km from the proposed MUL application area. There is no direct spatial overlap between the SAC and the proposed SI works, and no direct loss or physical

disturbance of the habitats for which the SAC is designated will occur. MARA nevertheless identified Harbour Porpoise [1351] as requiring further assessment due to the potential for underwater noise generated by the intrusive geotechnical investigations to result in disturbance or displacement of the species. The mobility of Harbour Porpoise means that individuals associated with the SAC may occur outside the designated site and within the wider marine environment.

Accordingly, the potential for underwater noise generated by the proposed SI works to negatively affect Harbour Porpoise and the conservation objective of the Codling Fault Zone SAC is assessed further in Section 5 of this NIS. Potential effects arising in combination with other plans and projects are considered in Section 5.8.

4.2.5 GUIDANCE AND SUPPORTING INFORMATION

- NPWS (2025) Conservation Objectives: Codling Fault Zone SAC 003015. Version 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
- NPWS (2023). Codling Fault Zone SAC (003015) Conservation Objectives Supporting Document – Marine Habitats. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
- NPWS (2024) Codling Fault Zone SAC (site code 003015) Conservation Objectives Supporting Document – Harbour Porpoise V1. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin, Ireland.

4.3 LAMBAY ISLAND SAC

4.3.1 OVERVIEW

Lambay Island SAC [000204] encompasses Lambay Island and the surrounding marine environment off the north County Dublin coast. Lambay island is located 4 km offshore and is the largest island off the east coast of Ireland. The island is characterised by steep sea cliffs along much of its northern, eastern and southern coastline, while the surrounding marine environment includes extensive rock reef habitat.

The SAC is designated for five qualifying interests: Reefs [1170], Vegetated Sea Cliffs of the Atlantic and Baltic coasts [1230], Harbour Porpoise (*Phocoena phocoena*) [1351], Grey Seal (*Halichoerus grypus*) [1364] and Harbour Seal (*Phoca vitulina*) [1365].

The marine environment surrounding Lambay Island provides suitable habitat for Harbour Porpoise, while the island and adjacent waters support populations of both Grey Seal and Harbour Seal. The proposed SI works at Dún Laoghaire Harbour are located 21.7 km from Lambay Island SAC and do not overlap the designated site. Consequently, the proposed maritime usage will not result in direct loss or physical disturbance of QI habitat within the SAC.

However, MARA's Appropriate Assessment Screening identified a potential source-pathway-receptor relationship between underwater noise generated by the proposed SI activities and the marine mammal QIs of Lambay Island SAC. Accordingly, Harbour Porpoise, Grey Seal, and Harbour Seal are considered further within the Stage 2 assessment.

A full site synopsis for the SAC is included in Appendix C of this report.

4.3.2 CONSERVATION OBJECTIVES

The current site-specific conservation objectives for Lambay Island SAC were published by NPWS in December 2024. The overall objective is to maintain the favourable conservation condition of the Annex I habitats and Annex II species for which the SAC designated.

The conservation objectives are defined through QI-specific attributes and targets relating to the extent, distribution, structure and function of the designated habitats and the requirements of the designated species.

For the marine mammal QIs, the relevant attributes and targets address matters including access to suitable habitat, disturbance and, for the seal species, the continued use and availability of important breeding, moulting and resting sites. The Qualifying Interests and their conservation objectives are presented in Table 4.3.

Table 4.3: Lambay Island SAC Qualifying Interests – Conservation Objectives Status

Code	Qualifying Interest	Conservation Objectives
1170	Reefs	To maintain the favourable conservation condition of Reefs in the SAC. Habitat area: permanent area should be stable or increasing, subject to natural process. Distribution: distribution of ref should be stable or increasing. Community Structure: conserve the reef community types in a natural condition.
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts	To maintain the favourable conservation condition of Vegetated Sea cliffs of the Atlantic and Baltic coats of the SAC. Habitat length, distribution, physical structure, hydrological regime, vegetation structure and composition: subject to natural process
1351	Harbour Porpoise (*Phocoena phocoena*)	To maintain the favourable conservation condition of Harbour Porpoise of the SAC. Suitable Habitat: Species range within the site should not be restricted by artificial barriers. Disturbance: human activities should occur at levels that do not adversely affect Harbour Porpoise.
1364	Grey Seal (*Halichoerus grypus*)	To maintain the favourable conservation condition of Grey Seal of the SAC. Access to suitable habitat, breeding, moulting and resting behaviour, disturbance and habitat quality.
1365	Harbour Seal (*Phoca vitulina*)	To maintain the favourable conservation condition of Harbour Seal of the SAC. Access to suitable habitat, breeding, moulting, resting, disturbance, habitat quality.

4.3.3 QUALIFYING INTEREST HABITATS RELEVANT TO THE PROPOSED SI WORKS

Reefs [1170] and Vegetated Sea Cliffs of the Atlantic and Baltic coasts [1230] are Qualifying Interests of the Lambay Island SAC, with site-specific conservation objectives to maintain their favourable conservation condition.

The proposed SI works are located 21.7 km from Lambay Island SAC and do not overlap the designated site. There will therefore be no direct loss, removal or physical disturbance of either QI habitat within the SAC.

The Appropriate Assessment carried out by MARA did not identify either Reefs [1170] or Vegetated Sea Cliff s [1230] as Qualifying Interests requiring further assessment at Stage 2. Accordingly, these habitat QIs are not considered further within this Stage 2 assessment.

This assessment will focus on the marine mammal Qualifying Interests identified by MARA, namely Harbour Porpoise (*Phocoena phocoena*) [1351], Grey Seal (*Halichoerus grypus*) [1364], and Harbour Seal (*Phoca vitulina*) [1365], in relation to potential underwater-noise disturbance and displacement.

4.3.4 HARBOUR PORPOISE [1351]

The Harbour Porpoise (*Phocoena phocoena*) is a Qualifying Interest of the SAC. The species is widely distributed in Irish coastal and offshore waters and is highly mobile, with individuals capable of ranging beyond the boundaries of designated sites.

The marine waters surrounding Lambay Island form part of the wider Irish Sea habitat available to Harbour Porpoise. The species uses sound extensively for navigation, communication and foraging and is therefore sensitive to anthropogenic underwater noise. Activities that introduce underwater sound have the potential, depending on their acoustic characteristics, magnitude and duration, to result in behavioural responses, temporary displacement from otherwise suitable habitat and, at sufficiently high received sound levels, auditory effects.

Previous surveys undertaken between 2008 and 2021 have recorded Harbour Porpoise within the waters surrounding the SAC. The most recent survey, reported by NPWS (2024) and undertaken by Berrow et al. (2021), estimated a Harbour Porpoise density of 0.83 ± 0.14 individuals per km² and an abundance of 227 ± 39 individuals (95% confidence interval: 161–321). Harbour Porpoise have been recorded throughout the year, including during breeding and calving seasons. The records demonstrate the importance of the marine environment around Lambay Island SAC for Harbour Porpoise.

The site-specific conservation objectives for Harbour Porpoise within the SAC are to maintain the favourable conservation condition of the species. The relevant conservation-objective attributes and targets relate to maintaining access to suitable habitat and ensuring that human activities occur at levels that do not adversely affect Harbour Porpoise at the site.

MARA's Appropriate Assessment Screening identified underwater noise generated by the proposed SI works as a potential source-pathway-receptor relationship with Harbour Porpoise. Accordingly, the potential for the proposed SI works to result in auditory effects, disturbance and/or temporary displacement of Harbour Porpoise is considered further within the Stage 2 assessment.

4.3.5 GREY SEAL [1364]

Grey Seal (*Halichoerus grypus*) [1364] is a Qualifying Interest of the SAC. Grey Seals utilise both terrestrial and marine habitats during their life cycle, coming ashore at established site for activities including breeding, moulting and resting, while undertaking foraging movements within the surrounding marine environment.

Lambay Island is an important site for Grey Seals and provides both terrestrial and marine foraging habitats. Grey Seals are mobile and may undertake movements over considerable distances from haul-out and breeding locations. Consequently, individuals associated with Lambay Island SAC are not restricted to the SAC boundary and may utilise the wider waters of the Irish Sea and Dublin Bay.

Recent surveys undertaken at Lambay Island SAC between July 2023 and January 2024 confirmed the importance of the SAC for Grey Seals. Berrow et al. (2024) recorded seal breeding activity in October 2023, when 77 Grey Seal pups were observed. The findings provided more recent evidence of breeding activity than a historical 2005 survey, which estimated 56 pups, and demonstrate the continued use of Lambay Island SAC as an important breeding site for the species.

The site-specific conservation objectives for Grey Seal within Lambay Island SAC are to maintain the favourable conservation condition of the species. This is defined through attributes and targets relating to access to suitable habitat, breeding, moulting, resting, disturbance and habitat quality.

Of particular relevance to the proposed SI works is the potential for underwater sound to result in disturbance or temporary displacement of Grey Seal while individuals are within the marine environment. The proposed works are geographically separated from the terrestrial breeding, moulting and resting areas associated with Lambay Island and will not result in direct physical disturbance or loss of these areas. Nevertheless, given the mobility of Grey Seal and the potential for individuals associated with the SAC to range through the wider marine environment, MARA identified underwater noise as a pathway requiring further consideration at Stage 2.

Accordingly, the potential for underwater noise generated by the proposed SI activities to result in auditory effects, behavioural disturbance and/or temporary displacement is assessed further in this NIS, including consideration of whether such effects could interfere with the conservation objective attributes and targets for Grey Seal within Lambay Island SAC.

4.3.6 HARBOUR SEAL [1365]

The Harbour Seal (*Phoca vitulina*) [1365] is a Qualifying Interest of the SAC. Harbour Seal utilise coastal and marine habitats for foraging and movement and depend upon terrestrial haul-out locations for breeding, moulting and resting.

Lambay Island supports established Harbour Seal haul-out areas and provides access to surrounding marine habitat used by the species. Harbour Seals routinely move between haul-out sites and marine foraging areas and may range beyond the boundaries of designated sites. Individuals associated with Lambay Island SAC may therefore occur within the wider marine environment beyond the SAC boundary.

Recent monitoring has confirmed the continued presence of Harbour Seal within the SAC. Surveys undertaken between July 2023 and January 2024 recorded 25 Harbour Seals, comprising 13 adults and 12 juveniles. No Harbour Seal pups were identified during the survey (Berrow et al. 2024). Moreover, a national aerial thermal imaging survey was undertaken in August 2024 which recorded 40 Harbour Seals within Lambay Island SAC, compared with 31 in 2003, 23 in 2011/2012 and 60 in 2017/2018 (Morris et al. 2025). These records confirm the presence and continue use of the SAC for Harbour Seals.

The site-specific conservation objectives for Harbour Seal within the SAC are to maintain the favourable conservation condition of the species. Relevant conservation objective attribute and targets relate to access to suitable habitat, breeding, moulting, resting, disturbance and habitat quality.

The proposed SI works are located 21.7 km from the SAC and will not directly interact with Harbour Seal breeding, moulting or resting sites within the SAC. However, underwater sound generated by the proposed SI activities represents a potential pathway for interaction with Harbour Seals when individuals are at sea.

Of particular relevance to the proposed SI works is the potential for underwater sound to result in disturbance or temporary displacement of Harbour Seal while individuals are within the marine environment. The proposed works are geographically separated from the breeding, moulting and resting areas associated with Lambay Island and will not result in direct physical disturbance or loss of these areas. Nevertheless, given the mobility of Harbour Seals and the potential for individuals associated with the SAC to range through the wider marine environment, MARA identified underwater noise as a pathway requiring further consideration at Stage 2.

4.3.7 GUIDANCE AND SUPPORTING INFORMATION

- NPWS (2024) Conservation Objectives: Lambay Island SAC 000204. Version 2. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
- NPWS. Lambay Island SAC (000204) Site Synopsis.
- NPWS (2024). Lambay Island SAC (000204): Conservation Objectives Supporting Document – Harbour Porpoise. Version 1.
- NPWS. Lambay Island SAC (000204): Conservation Objectives Supporting Document – Marine Habitats.
- NPWS. Lambay Island SAC (000204): Conservation Objectives Supporting Document – Coastal Habitats.

- NPWS (2013). Lambay Island SAC (000204): Conservation Objectives Supporting Document – Marine Habitats and Species. Version 1.
- NPWS (2013). Lambay Island SAC (000204): Conservation Objectives Supporting Document – Coastal Habitats.
- NPWS (2024) – Lambay Island SAC Harbour Porpoise Supporting Document pages 2–4.
- Berrow et al. (2024). Lambay Island seal surveys, July 2023–January 2024, as reported in the Dublin Array NIS (2025).
- Morris, C.D., Riddoch, N.G., Duck, C.D., Waitland, S.A. & Russell, D.J.F. (2025). Aerial thermal-imaging survey of seals in Ireland in August 2024. Irish Wildlife Manuals, No. 158. National Parks and Wildlife Service.
- Dublin Port Company (2025). Seal Survey of Dublin Bay, covering June 2023–January 2024.

5 ASSESSMENT OF IMPACTS AND MITIGATION

Having outlined the proposed site investigation (SI) works and the European sites relevant to the assessment, the potential for effects on the conservation objectives of these sites is considered below. The assessment has regard to the nature, scale, location and duration of the proposed works and considers potential direct and indirect pathways through which the proposed activities could interact with the Qualifying Interests (QIs) of the relevant European sites.

Direct impacts: Direct effects may arise where works physically overlap with a European site or result in the direct loss, alteration or disturbance of habitat supporting its QIs, potential for disturbance or displacement of marine mammal QIs such as direct impact via underwater noise on a QI mammal species. MARA identified underwater noise as the principal pathway requiring further assessment at Stage 2.

The proposed SI works will not physically overlap with the European Sites identified for Stage 2 assessment and will not result in permanent habitat loss within these sites. Temporary and localised physical disturbance of the seabed may occur at individual marine SI locations, principally during borehole drilling and vibrocore sampling. Such disturbance will be confined to the immediate vicinity of the proposed SI locations and will not result in direct loss of habitat within the relevant European Sites.

Indirect impacts: Indirect effects may arise where a source–pathway–receptor relationship exists between the proposed SI activities and the QIs of a European site. Other pathways, including sediment mobilisation, accidental pollution, airborne noise and visual disturbance, were considered through the screening process and removed from the assessment.

The Stage 2 assessment therefore focuses on underwater noise and the potential for effects on Harbour Porpoise, Grey Seal and Harbour Seal, including in combination with other plans and projects.

5.1 IDENTIFICATION AND APPRAISAL OF POTENTIAL IMPACTS ON EUROPEAN SITES

The Stage 1 Appropriate Assessment Screening prepared for the proposed SI works concluded that the project, either alone or in combination with other plans or projects, would not give rise to likely significant effects on European sites in view of their conservation objectives. Notwithstanding the conclusions of this screening, MARA subsequently determined that a Natura Impact Statement (NIS) was required. Accordingly, this NIS provides a more detailed and precautionary assessment of the potential interactions between the proposed SI works and Rockabill to Dalkey Island SAC [003000], Codling Fault Zone SAC [003015] and Lambay Island SAC [000204], having regard to their respective conservation objectives and the Qualifying Interests identified by MARA for further assessment.

MARA's Appropriate Assessment Screening and Determination (2026) considered the potential for effects associated with the proposed SI works arising from underwater noise, airborne noise and visual disturbance, and physical disturbance, turbidity and siltation.

With regard to physical disturbance and habitat degradation, including potential effects arising from seabed disturbance, turbidity and siltation, MARA concluded that significant effects on the relevant habitat conservation objectives were unlikely, having regard to the limited scale, duration and magnitude of the proposed works. Similarly, potential airborne noise and visual disturbance were not identified as likely to result in significant effects, taking account of the temporary nature of the activities and the existing levels of activity within Dún Laoghaire Harbour. These impact pathways were therefore not identified as requiring further assessment at Stage 2.

However, MARA identified the potential for underwater noise generated by the proposed SI activities to result in disturbance and displacement of marine mammals associated with Rockabill to Dalkey Island SAC [003000], Codling Fault Zone SAC [003015], and Lambay Island SAC [000204]. The potential for such effects to arise in combination with other plans and projects could not be excluded.

Accordingly, this NIS focuses on the potential effects of underwater noise on Harbour Porpoise (*Phocoena phocoena*) [1351], Grey Seal (*Halichoerus grypus*) [1364] and Harbour Seal (*Phoca vitulina*) [1365], as identified by MARA for Stage 2 Appropriate Assessment. The assessment considers the nature, magnitude, duration and extent of potential effects, the relevant site-specific conservation objectives, proposed mitigation measures and residual effects, both for the proposed SI works alone and in combination with other plans and projects. The conclusions for each European site are presented in Sections 5.7–5.9, with the potential for in-combination effects considered in Section 5.6.

5.2 SIGNIFICANCE OF EFFECTS

The potential pathways are assessed in detail in relation to each relevant Qualifying Interest and the applicable Site-Specific Conservation Objectives in the relevant European Site sections of this NIS. The significance of these effects is defined in Table 5.1 below. The following definitions of impact significance, probability, and duration are those given in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022).

Table 5.1: Significance of Effects

Type of Effect	Description
Imperceptible Effects	An effect capable of measurement but without significant consequences.
Not Significant Effects	An effect which causes noticeable changes in the character of the environment but without significant consequences.

Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration, or intensity, alters a sensitive aspect of the environment.
Very Significant Effects	An effect which, by its character, magnitude, duration, or intensity, significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

5.3 PROBABILITY OF EFFECTS

The probability of effects is broken into the following types:

- Likely effects are those that can reasonably be expected to occur because of the proposed SI works if all mitigation measures are implemented.
- Unlikely effects are those that can reasonably be expected not to occur because of the proposed SI works if all mitigation measures are implemented.

5.4 DURATION OF EFFECTS

The duration of effects is defined as follows:

- Momentary Effects: effects lasting seconds to minutes
- Brief Effects: effects lasting less than a day.
- Temporary Effects: effects lasting less than a year.
- Short-term Effects: effects lasting 1 to 7 years.
- Medium-term Effects: effects lasting 7 to 15 years.
- Long-term Effects: effects lasting 15 to 60 years.
- Permanent Effects: effects lasting over 60 years.

5.5 UNDERWATER NOISE

5.5.1 SOURCES OF UNDERWATER NOISE

The proposed SI works have the potential to generate temporary and localised underwater sound associated with marine borehole drilling, CPT, vibrocore sampling, MBES, and associated marine plant and vessel activity. The characteristics of the underwater sound generated by these activities will vary according to the type of equipment, operating conditions, duration of activity and location of the individual investigation. The proposed marine SI works comprise up to 21 boreholes. 16 CPT locations, 6 vibrocore locations and MBES surveying, together with associated vessel and marine plant operations.

MARA identified underwater noise generated by the proposed intrusive geotechnical investigations as an impact pathway requiring further assessment at Stage 2 Appropriate Assessment. The potential for underwater sound to result in disturbance, displacement or other effects on marine mammal Qualifying Interests is therefore considered in relation to Harbour Porpoise (*Phocoena phocoena*) [1351], Grey Seal (*Halichoerus grypus*) [1364] and Harbour Seal (*Phoca vitulina*) [1365], as relevant to the European Sites identified by MARA.

The project-specific Annex IV Species Risk Assessment (OCSC, 2026) considered potential underwater acoustic characteristics of the proposed survey techniques. The operating frequencies identified for the activities are summarised below in Table 5.2.

Table 5.2: Summary of Proposed SI works and underwater noise characteristics.

SI Activity	Extent	Frequency identified in Annex IV	Characteristics
Marine borehole drilling	21 boreholes	600Hz	Underwater noise generated by drilling machinery and interaction with seabed materials. Predominantly low-frequency mechanical sound, with characteristics dependent on the drilling method and ground conditions
Cone Penetration Testing (CPT)	16 locations	20-200Hz	Low- frequency mechanical noise associated with hydraulic equipment operation and penetration of seabed sediments.
Vibrocore sampling	6 locations	50Hz	Underwater noise and vibration generated by the vibrocore equipment and interaction with seabed sediments
Multibeam echosounder (MBES)	Zone E	400-700kHz	High-frequency acoustic pulses transmitted towards the seabed from a moving survey vessel. Sound characteristics depend on the equipment's operating frequency, pulse duration and beam direction.
Marine plant and vessels	Throughout marine SI works	Equipment-dependant	Continuous or intermittent underwater noise associated with vessel movement, engines generators and positioning activities. Acoustic characteristics vary according to equipment and operating conditions.

A project-specific underwater noise assessment has subsequently been undertaken by Wave Dynamics (2026), using published acoustic measurements and representative source levels for comparable marine investigation equipment. The assessment distinguishes between rotary core drilling, sonic drilling and cable percussion boring, in addition to CPT, vibrocore sampling and associated vessel activity. The adopted source levels, operating assumptions and predicted acoustic effect ranges are presented in Section 5.5.2 below, with the full assessment provided in Appendix D.

The frequencies shown in Table 5.2 represent those identified in the Annex IV Species Risk Assessment (OCSC, 2026). Mechanical equipment may produce broadband sound and harmonics extending beyond its principal operating frequency. Similarly, acoustic survey equipment may generate sound energy across a range of frequencies, depending on the equipment and its operating parameters. The potential effects of

underwater noise are therefore dependent on the characteristics of the complete acoustic output rather than frequency alone (RPS, 2024).

5.5.2 UNDERWATER ACOUSTIC ASSESSMENT

The potential effects of underwater noise on marine mammals depend on a range of factors, including the characteristics and intensity of the sound source, frequency content, duration and repetition of the sound, distance from the source, species sensitivity and the behaviour and distribution of animals within the affected area. Potential effects can range from temporary behavioural responses and avoidance to auditory injury or temporary changes in hearing sensitivity where exposure to sufficiently high sound levels occurs at close range.

A project-specific underwater noise assessment has been prepared by Wave Dynamics (2026) to evaluate the potential effects of underwater sound generated by the proposed marine SI activities on marine mammals. The assessment considers the relevant sound sources, representative source levels, underwater sound propagation, species-specific auditory exposure criteria and predicted auditory and behavioural effect ranges. The assessment is based on the proposed investigation activities and conservative operating assumptions, with the full technical report provided in Appendix D.

Marine Mammal Functional Hearing Groups

Marine mammal species differ in their hearing sensitivity and the frequencies over which they can detect underwater sound. Consequently, the potential for auditory effects must be considered with reference to the appropriate functional hearing group.

Harbour Porpoise is classified within the very high-frequency cetacean hearing group, whereas Grey Seal and Harbour Seal are classified within the phocid carnivores in water hearing group. These classifications are relevant to the application of species-specific auditory exposure criteria.

Table 5.3: Functional Hearing Groups Relevant to the Marine Mammal QI

Qualifying Interest	Functional hearing group	Generalised hearing range
Harbour Porpoise (*Phocoena phocoena*)	Very high-frequency cetaceans (VHF)	200Hz to 165kHz
Grey Seal (*Halichoerus grypus*)	Phocid carnivores in water (PCW)	40Hz to 90kHz
Harbour Seal (*Phoca vitulina*)	Phocid carnivores in water (PCW)	40Hz to 90kHz

5.5.2.1 ACOUSTIC MODELLING METHODOLOGY

The underwater noise assessment adopted representative sound source levels from published measurements of comparable marine investigation equipment. Where measured source levels were unavailable, conservative assumptions were applied, including for sonic drilling and CPT. The assessment considered rotary core drilling, sonic drilling, cable percussion boring, CPT, vibrocore sampling and associated vessel and jack-up positioning activities.

Underwater sound propagation was predicted using a logarithmic spreading model incorporating empirical shallow-water coefficients (Wave Dynamics, 2026). The model did not account for site-specific bathymetry, seabed characteristics or sound-speed profiles, as these data were unavailable at the time of assessment. Cumulative acoustic exposure was calculated assuming a marine mammal remained stationary at a fixed distance from the source for the full assumed daily operating duration.

The assessment applied the auditory exposure criteria presented by Southall et al. (2019), with a sensitivity check undertaken using the updated NMFS (2024) guidance. Indicative behavioural disturbance ranges were calculated using precautionary received sound-level thresholds of 120 dB re 1 µPa SPLrms for continuous sources and 160 dB re 1 µPa SPLrms for impulsive sources.

The adopted modelling assumptions provide estimates of potential acoustic exposure under the assessed scenarios. The resulting effect ranges are dependent on the source levels, activity durations and propagation assumptions applied and do not represent measured underwater-noise conditions at the proposed SI locations.

The representative underwater sound source levels adopted in the project-specific acoustic assessment are summarised in Table 5.4. The corresponding predicted auditory effect ranges for the relevant marine mammal Qualifying Interests, based on the Southall et al. (2019) criteria, are presented in Table 5.5 (Wave Dynamics, 2026).

Table 5.4: Underwater Sound Source Levels Adopted in the Acoustic Assessment (Wave Dynamics, 2026)

Source	Adopted source level	Assumed daily duration
Rotary core drilling	145 dB re 1 µPa SPLrms at 1 m	8 hours
Sonic drilling	187 dB re 1 µPa SPLrms at 1 m	8 hours
Cable percussion boring	200 dB SPLpeak; 160 dB re 1 µPa²s SELss	8 hours
CPT	175 dB re 1 µPa SPLrms at 1 m	4 hours
Vibrocore	187 dB re 1 µPa SPLrms at 1 m	1 hour
Vessel / jack-up positioning	170 dB re 1 µPa SPLrms at 1 m	2 hours

Table 5.5: Predicted Auditory Effect Ranges for Relevant Marine Mammal Qualifying Interests (Wave Dynamics, 2026).

Activity	Harbour Porpoise PTS	Harbour Porpoise TTS	Grey/Harbour Seal PTS	Grey/Harbour Seal TTS
Rotary core drilling	<1 m	5 m	<1 m	3 m
Sonic drilling	86 m	730 m	42 m	426 m
Cable percussion boring	13 m	82 m	6 m	43 m
CPT	13 m	156 m	6 m	78 m
Vibrocore	28 m	304 m	13 m	159 m
Vessel / jack-up positioning	5 m	59 m	2 m	29 m

Indicative behavioural disturbance ranges were also calculated by Wave Dynamics (2026), with the greatest predicted extent of approximately 1.7km associated with sonic drilling and vibrocore sampling. These ranges are based on precautionary acoustic thresholds and do not necessarily indicate that all marine mammals within the predicted area would exhibit a behavioural response. The potential ecological implications of behavioural disturbance are considered further in Section 5.5.3.

5.5.2.2 ACOUSTIC EFFECTS

The potential for underwater-noise effects on marine mammals depends on the characteristics and intensity of the sound source, exposure duration, sound propagation conditions and species-specific hearing sensitivity. Potential effects include Permanent Threshold Shift (PTS), Temporary Threshold Shift (TTS), behavioural disturbance, acoustic masking and temporary displacement from otherwise suitable marine habitat (Southall et al., 2019, NMFS, 2024).

The proposed SI works will be undertaken within and adjacent to Dún Laoghaire Harbour, an established and active harbour environment subject to regular vessel movements, marina activity, sailing, rowing, watersports and other recreational and commercial activities. The existing acoustic environment therefore contains anthropogenic underwater sound. However, the presence of existing background activity does not preclude additional temporary disturbance arising from the proposed SI works, particularly where marine mammals occur in proximity to active investigation locations.

The principal underwater-noise-generating activities comprise marine borehole drilling, CPT, vibrocore sampling and associated marine plant and vessel operations. These activities will generate underwater sound through mechanical equipment operation and, in the case of geotechnical investigations, interaction with seabed materials. The acoustic characteristics and potential effects vary according to the investigation method and operating conditions, as assessed by Wave Dynamics (2026).

The project-specific underwater noise assessment (Wave Dynamics, 2026) predicted the greatest auditory effect ranges during sonic drilling. For Harbour Porpoise, the predicted PTS and TTS onset ranges were

approximately 86m and 730m, respectively. For Grey Seal and Harbour Seal, the corresponding ranges were approximately 42m and 426m using the Southall et al. (2019) criteria. The NMFS (2024) sensitivity assessment identified maximum auditory injury and TTS ranges of approximately 100m and 800m, respectively, for seals under the sonic drilling scenario.

The assessment also identified an indicative behavioural disturbance range of up to approximately 1.7 km for sonic drilling and vibrocore sampling. These distances represent modelled acoustic effect ranges under the adopted assessment assumptions and do not indicate that all marine mammals within the identified areas would necessarily experience auditory effects or behavioural disturbance. Similarly it does not take into account the protective acoustic nature of the existing harbour walls.

MBES surveying differs from intrusive geotechnical activities in that it involves the transmission of high-frequency acoustic pulses from a moving survey vessel. The proposed MBES equipment will operate at a stated frequency of 400–700 kHz. Wave Dynamics (2026) excluded MBES from its quantitative acoustic modelling on the basis that the stated operating frequencies exceed the hearing ranges of the relevant marine mammals. However, the earlier Annex IV Species Risk Assessment (OCSC 2026) identified potential acoustic effects associated with MBES. This difference in assessment approach requires clarification before the final NIS is issued.

The proposed SI works will be temporary and undertaken at discrete investigation locations, with the overall programme not exceeding 12 weeks. Individual activities will therefore be spatially and temporally limited, and no permanent underwater-noise source will be introduced.

Marine mammals may exhibit behavioural responses to underwater noise, including temporary avoidance or displacement from active investigation locations. However, their mobility does not, in itself, demonstrate that potential effects will be insignificant. The predicted acoustic effect ranges do not extend into the boundaries of Rockabill to Dalkey Island SAC, Lambay Island SAC or Codling Fault Zone SAC under the modelled scenarios. Nevertheless, marine mammals associated with these SACs may occur outside designated site boundaries, including within Dublin Bay and Dún Laoghaire Harbour.

Potential effects are considered further in relation to the conservation objectives and, where applicable, the associated attributes and targets of the relevant European Sites. The detailed assessment of potential effects on the marine mammal Qualifying Interests is presented in the respective European Site sections of this NIS, with potential in-combination underwater-noise effects considered in Section 5.6.

5.5.3 POTENTIAL EFFECTS ON MARINE MAMMALS

Underwater noise associated with the proposed SI works has the potential to affect marine mammals through auditory effects, behavioural disturbance, interference with acoustic communication and temporary displacement from otherwise suitable marine habitat.

The nature and magnitude of any effects will depend on the received sound level, frequency content, exposure duration, species-specific hearing sensitivity and the behaviour of the individual animal at the time of exposure.

The potential ecological consequences of behavioural disturbance depend on the duration, frequency and spatial extent of exposure, together with the importance of the affected area for the species. Temporary avoidance of an active work area does not necessarily indicate a significant effect on the conservation objectives of a European Site. However, repeated disturbance or displacement from important foraging areas, or interference with access to habitats supporting essential ecological functions, may have greater consequences. Accordingly, the predicted behavioural disturbance range is considered in conjunction with the duration and location of the proposed SI works, the requirements of the marine mammal Qualifying Interests and the conservation objectives of the relevant SACs.

The greatest indicative behavioural disturbance range predicted by Wave Dynamics (2026) was approximately 1.7km, associated with sonic drilling and vibrocore sampling. Temporary avoidance or displacement may therefore occur within the harbour and adjacent coastal waters during these activities. The potential significance of such disturbance depends on the duration and frequency of exposure, the availability of alternative habitat, and whether repeated disturbance could affect foraging, commuting or other essential behaviours. The modelled range does not establish that all marine mammals within this distance will respond, but it provides a precautionary basis for assessing the potential spatial extent of disturbance. Similarly it does not take into account the protective acoustic nature of the existing harbour walls.

Permanent Threshold Shift (PTS) refers to a permanent reduction in hearing sensitivity following exposure to sufficiently intense underwater sound. The potential for PTS is influenced by the characteristics of the acoustic source, received sound levels, exposure duration and the hearing sensitivity of the relevant species.

The project-specific underwater noise assessment (Wave Dynamics, 2026) predicted the greatest Permanent Threshold Shift (PTS) onset range for Harbour Porpoise during sonic drilling, extending to approximately 86m from the source. For Grey Seal and Harbour Seal, the corresponding predicted range was approximately 42m using the Southall et al. (2019) criteria. Application of the updated NMFS (2024) criteria resulted in a maximum predicted auditory injury range of approximately 100m for seals under the assessed sonic drilling scenario. These findings indicate that the greatest potential for auditory injury is associated with exposure in close proximity to active sonic drilling operations.

Grey Seal and Harbour Seal are classified within the phocid carnivores in the water hearing group under the updated NMFS (2024) guidance. Both species are capable of detecting underwater sound across a broad frequency range, although hearing sensitivity varies with frequency. The potential for auditory injury is therefore dependent not only on the magnitude of underwater sound but also on the frequency characteristics of the proposed equipment and the cumulative sound exposure experienced by an individual.

Southall et al. (2019) established auditory exposure criteria for phocids in water, distinguishing between impulsive and non-impulsive sound sources and applying frequency-weighted cumulative Sound Exposure Level (SEL) criteria. The updated NMFS (2024) guidance similarly provides auditory injury and Temporary Threshold Shift (TTS) onset criteria for phocids.

These criteria provide an established scientific basis for assessing the potential for underwater noise generated by the proposed borehole drilling, CPT, vibrocore sampling, MBES and associated vessel activity to result in auditory effects on Grey Seal and Harbour Seal.

5.5.4 MITIGATION MEASURES

To minimise the potential for underwater-noise disturbance and auditory effects on Harbour Porpoise (*Phocoena phocoena*), Grey Seal (*Halichoerus grypus*) and Harbour Seal (*Phoca vitulina*), the following mitigation measures shall be implemented during the proposed marine SI works, subject to confirmation that they are appropriate and effective based on the completed Underwater Acoustic Assessment and the final agreed marine mammal mitigation protocol:

- Marine Mammal Observer (MMO): a suitably qualified and experienced MMO shall be appointed to monitor for the presence of marine mammals before commencement of relevant underwater noise generating activities. The MMO shall undertake observations in accordance with the agreed marine mammal mitigation protocol.
- Marine mammal monitoring records: The appointed MMO shall maintain records of marine mammal observations, pre-start monitoring, commencement and cessation of relevant activities, mitigation delays and implementation of the agreed monitoring procedures. Records shall be maintained in accordance with DAHG (2014), and an MMO and mitigation report shall be prepared and submitted to NPWS following completion of the relevant works, in accordance with the agreed reporting requirements.
- Exclusion zone: A 500m radius Monitored Zone shall be established around the relevant underwater sound source, in accordance with DAHG (2014). A minimum 30-minute pre-start watch shall be undertaken under suitable observation conditions. Where a marine mammal is detected within the Monitored Zone, commencement shall be delayed until the animal has left the zone and a further 30-minute period has elapsed without additional sightings.
- Soft-start/ramp-up procedure: Where technically feasible, a gradual soft-start or ramp-up procedure shall be implemented for sonic drilling, cable percussion boring and vibrocore sampling, with the operating intensity increased progressively over approximately 20 to 40 minutes before full operation. Following an interruption in relevant noise-generating activity exceeding 30 minutes, the required pre-start monitoring and applicable ramp-up procedure shall be repeated.
- Duration and operation of equipment: Underwater noise generating activates shall be restricted to the minimum duration necessary to complete each investigation. Equipment shall be switched off when

not in use and unnecessary simultaneous operation of noise generating equipment shall be avoided where practicable.

- Vessel movement: Survey vessels and marine plant shall be maintained in good working order. Unnecessary engine idling and avoidable vessel manoeuvring shall be minimised to reduce additional underwater noise.
- Monitoring conditions: Relevant underwater-noise-generating activities shall commence during daylight hours and in conditions suitable for effective visual monitoring. Activities shall not commence where the required pre-start monitoring cannot be completed effectively.
- Concurrent activities: Where underwater noise generating activities are undertaken simultaneously at separate investigation locations, suitable MMO coverage and Monitored Zones shall be provided for each relevant source.
- Selection of drilling methodology: Where ground conditions and investigation requirements permit, rotary core drilling shall be preferred over sonic or cable percussion drilling at over-water investigation locations, given its lower predicted underwater-noise exposure. Intertidal investigations shall be undertaken in the dry at low water where practicable, thereby reducing direct underwater sound transmission from the investigation equipment.

5.5.5 RESIDUAL EFFECTS

Following implementation of the proposed mitigation measures, underwater-noise effects associated with the proposed SI works are expected to be temporary and limited to periods when the relevant equipment is operating. The proposed works will not introduce a permanent source of underwater noise, will not result in permanent displacement of marine mammals, will not create a permanent barrier to marine mammal movement or result in permanent loss of marine habitat.

The proposed mitigation measures are intended to reduce the risk of underwater-noise exposure and disturbance to marine mammals during the commencement and operation of applicable noise-generating activities. These measures include pre-commencement monitoring, delaying the commencement of activities where marine mammals are detected within the relevant mitigation zone, and the use of ramp-up/soft-start procedures where applicable.

5.5.6 SUMMARY OF IMPACTS FOR UNDERWATER NOISE

Table 5.6: Summary of Impacts for Underwater Noise

Impact Pathway	Relevant QI Receptors	Potential Effect	Key Mitigation	Residual Effect Following Mitigation
Underwater Noise	Harbour Porpoise [1351], Grey Seal [1364] and Harbour Seal [1365], as relevant to the European Sites.	Temporary exposure to underwater sound generated by marine borehole drilling, CPT, vibrocore sampling, MBES and associated marine plant and vessel activity, with potential for behavioural disturbance, TTS and, at close range, auditory injury.	Limit underwater noise generating activities to the minimum duration necessary; undertake works at discrete investigation locations; avoid unnecessary simultaneous operation of noise-generating equipment where practicable; undertake marine mammal pre-commencement monitoring in accordance with the Risk Assessment for Annex IV Species; delay commencement where a marine mammal is identified within the relevant monitoring zone; implement ramp-up/soft-start procedures where applicable; maintain equipment in good working order.	Temporary, spatially restricted and reversible. No permanent underwater-noise source, permanent displacement or permanent loss of marine habitat. No significant residual effects on the conservation objectives of the relevant marine mammal QIs are anticipated.

5.6 IN-COMBINATION EFFECTS WITH OTHER PLANS AND PROJECTS

The potential for in-combination effects has been considered in relation to other plans and projects that could reasonably interact with the proposed site investigation (SI) works through common impact pathways, including underwater noise, physical disturbance, turbidity and siltation, water quality, and vessel activity. Particular consideration has been given to relevant marine activities and Maritime Usage Licence applications and permissions within the wider Dún Laoghaire Harbour and Dublin Bay area. The assessment has considered the nature, location and likely timing of these activities, where information is available.

The proposed works are located within the highly active Dún Laoghaire Harbour environment, where existing recreational, commercial and maritime activities occur. The potential for in-combination effects is principally associated with other plans or projects that may occur within the wider Dublin Bay area and contribute to underwater noise and other pressures potentially affecting marine mammal Qualifying Interests. The potential for effects will depend on the nature, location, timing and duration of the relevant activities, and the extent to which their effects could overlap with those of the proposed SI works.

The proposed SI works are temporary, localised and of limited duration, with the overall programme not exceeding 12 weeks. The current proposal does not include permanent habitat loss, dredging, reclamation, permanent structures or an operational phase. These characteristics have been taken into account when considering the potential for temporal and spatial overlap with other plans and projects; however, the temporary nature of the works does not, in itself, exclude the possibility of in-combination effects.

A review of planning permissions in the vicinity of the proposed works identified a number of developments and marine activities of greater than single-domestic scale that may have the potential for construction-stage overlap. The projects considered relevant to the in-combination assessment are presented in Table 5.5. Their potential to act in combination with the proposed SI works has been considered having regard to the available information on their location, nature, timing and potential impact pathways.

Table 5.7: Other projects near the area that may have in-combination effects with the works.

Application Reference	Details	Construction Stage Overlap	Ecological Effects	Location & Proximity	Rationale
MUL250003	Schedule 7 (3): Marine environmental surveys for the purposes of site investigation – to undertake a suite of marine site investigation activities to assess the feasibility of potential future dredging within the harbour.	MUL Commencement Date: 18/06/2026. License valid for 2 years, potential overlap	Temporary seabed disturbance, sediment mobilisation, vessel activity, underwater noise and potential disturbance/displacement of SCI birds.	Within Dún Laoghaire Harbour and therefore in close proximity to the proposed SI works.	The project is considered relevant due to the similar nature of the works and proximity of this project to the proposed marine SI works. There is the potential for common pathways and temporal overlap.
MUL240023	To undertake a Geotechnical Investigation, Geophysical site investigation surveys, ecology and marine archaeology surveys to inform design options for the proposed East Coast Rail Infrastructure Protection Projects (ECRIPP).	MUL Commencement Date: 22/10/2025. License valid for 6 years, potential overlap.	Marine survey activity, vessel movements, underwater noise and potential temporary seabed disturbance.	Dún Laoghaire / wider Dublin Bay area.	The project is considered relevant due to the similar nature of the works and proximity of this project to the proposed marine SI works. There is the potential for common pathways and temporal overlap.
MUL230034	CWPL intends to undertake survey mobilisations at the proposed Licence Area to inform the location and detailed design of the proposed CWP OWF, export cable route, potential operations and maintenance base, potential land reclamation area at the potential onshore substation location, and additional buffer zones.	MUL Commencement Date: 23/02/2026. License valid for 3 years, potential overlap.	Marine survey activity, vessel movements, underwater noise, above-water noise and visual disturbance, with potential for temporary physical disturbance of the marine environment.	Irish Sea off the coasts of Dublin and Wicklow; approximately 0.36 km from the proposed MUL area.	The project involves marine environmental surveys for site investigation and is considered relevant due to its proximity and similar nature to the proposed SI works. The potential for common pathways, including underwater noise, and temporal overlap has therefore been considered.
MUL240010	Site investigation works to inform the engineering design and environmental assessments of a proposed electrical cable circuit crossing Dublin Bay from Blackrock Park to Shellybanks	MUL Commencement Date: 24/03/2026. License valid for 2 years, potential overlap.	Marine geophysical and geotechnical survey activity, vessel movements, underwater noise, above-water noise and visual disturbance, with potential for temporary seabed disturbance.	Dublin Bay, between Blackrock Park and Shellybanks, with the wider survey area extending towards Dún Laoghaire West Pier.	The project involves marine site investigation works within Dublin Bay and has potential spatial and temporal overlap with the proposed SI works. The similar nature of the investigations and potential for common underwater-noise and vessel-related pathways make the project relevant to the in-combination assessment.
MAC20230012	Permitted Maritime Usage - ORE Operations and Maintenance facility	MAC Commencement Date: 30/1/2024. License valid for 45 years, potential overlap	Vessel activity, noise, visual disturbance and marine construction/operational activity.	St Michael's Pier, Dún Laoghaire Harbour.	The project is considered relevant due to its location within the harbour, potential for common vessel and disturbance pathways. There is the potential for common pathways and temporal overlap.

Application Reference	Details	Construction Stage Overlap	Ecological Effects	Location & Proximity	Rationale
MAC240020	Permitted Maritime Usage - General Harbour Operations and Operations and Maintenance Base	MAC Commencement Date: 12/11/2024. License valid for 45 years, potential overlap	Vessel activity, marine operations, noise and visual disturbance.	Dún Laoghaire Harbour.	The project is considered relevant due to its location within the harbour, potential for common vessel and disturbance pathways. There is the potential for common pathways and temporal overlap.
FS004490	Dún Laoghaire Marina	Foreshore Commencement Date: 29/12/1999. License valid until 29/12/2098, potential overlap	Marina and vessel activity, including associated noise and visual disturbance within the harbour environment.	Dún Laoghaire Harbour.	The Dún Laoghaire Marina is located within the harbour and forms part of the existing marine activity within the area. It has therefore been considered in relation to potential cumulative vessel activity, noise and visual disturbance.
FS006786	St Michaels Pier	Foreshore Commencement Date: 01/02/2022. License valid until 31/01/2037, potential overlap	Pier and vessel activity, including associated noise and visual disturbance within the harbour environment.	St Michael's Pier, Dún Laoghaire.	The project is located within Dún Laoghaire and contributes to the existing marine activity within the harbour. It has therefore been considered in relation to potential cumulative vessel activity, noise and visual disturbance.
FS007613	Moorings	Foreshore Commencement Date: 2024	Mooring and vessel activity, with associated noise and visual disturbance within the harbour environment.	Dún Laoghaire Harbour.	The moorings are located within the harbour and contribute to existing vessel and marine activity. The project has therefore been considered in relation to potential cumulative disturbance and vessel-related effects.
MAC20230009	Permitted Maritime Usage - Coastal Protection Works	MAC Commencement Date: 06/03/2026. License valid for 50 years, potential overlap	Coastal protection construction and associated plant and vessel activity, with potential for temporary noise and visual disturbance and localised marine/foreshore disturbance.	Merrion Gates to Seapoint Beach, Co. Dublin.	The project involves coastal protection works along the Dublin Bay coastline and has the potential to overlap temporally with the proposed SI works. It has therefore been considered in relation to potential cumulative construction-related noise, visual disturbance and marine activity.
MAC250050	Permitted Maritime Usage - The installation of slipways, and the creation of areas of reclaimed land within designated zones	MAC Commencement Date: 01/04/2026. License valid for 55 years, potential overlap	Construction of slipways, pontoon infrastructure and reclaimed areas, with potential for temporary construction noise, vessel/plant activity and localised marine and foreshore disturbance.	Dún Laoghaire Harbour.	The project is located within Dún Laoghaire Harbour and involves marine, and foreshore construction works. It has therefore been considered due to its proximity and potential for temporal overlap and common construction-related disturbance pathways.

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

- Dún Laoghaire Harbour Master Plan
- Dublin Bay Biosphere Biodiversity Conservation and Research Strategy 2022-2026.
- Dublin City Council Development Plan 2022–2028
- Dublin City Council - Climate Neutral Dublin 2030, 2024
- Dún Laoghaire Rathdown Development Plan 2022-2028
- Dún Laoghaire County Council Climate Action Plan 2024-2029
- Dún Laoghaire-Rathdown (DLR) Biodiversity Action Plan for 2021-2025
- Climate Action Plan 2025 and Water Action Plan 2022–2027
- Regional Spatial and Economic Strategy 2019-2031
- National Sports Policy 2018 – 2027
- National Port Policy 2013 and Consultation draft 2026.

The potential for in-combination effects has been considered in relation to the plans and projects identified in Table 5.5, considering their nature, location, timing and potential to interact with the proposed site investigation works through common source–pathway–receptor relationships. Particular consideration has been given to the marine projects identified by MARA as part of its Appropriate Assessment Screening and Determination, given the potential for common pathways associated with marine vessel activity and underwater noise.

The marine site investigation and survey projects identified in Table 5.5, including MUL250003, MUL240023, MUL230034 and MUL240010, represent projects with the greatest potential for a common underwater-noise pathway with the proposed SI works. These projects involve marine survey and/or geotechnical investigation activities and may therefore generate temporary underwater noise and associated vessel activity. The potential for temporal and spatial overlap has been considered having regard to the available information on the respective licence periods, locations and nature of the proposed activities. The existence of a valid licence does not, in itself, confirm that activities will take place concurrently with the proposed SI works; actual or reasonably foreseeable temporal overlap should be established where information is available.

The remaining marine projects, including MAC20230012, MAC240020, FS004490, FS006786 and FS007613, mainly consist of existing or permitted harbour, marina, pier, mooring and marine operational activities. These activities contribute to the existing vessel and anthropogenic noise environment within Dún Laoghaire Harbour and have therefore been considered in the context of cumulative vessel activity and disturbance. However, they do not consist of the same type or intensity of intrusive geotechnical activity as the proposed SI works.

MAC20230009 and MAC250050 have also been considered due to their marine/coastal construction elements and potential for temporary construction activity, vessel and plant movements and associated noise and disturbance. The potential for these activities to overlap temporally with the proposed SI works has been considered where information is available. Their contribution to in-combination effects on the relevant marine mammal Qualifying Interests will depend on the nature and timing of the activities and the presence of a

credible common impact pathway. Where available, the conclusions of associated Appropriate Assessment Screening Reports have also been considered.

The primary in-combination impact pathway relevant to the European Sites identified for this Stage 2 assessment is temporary underwater noise and associated disturbance or displacement of marine mammal Qualifying Interests, namely Harbour Porpoise associated with Rockabill to Dalkey Island SAC, Codling Fault Zone SAC and Lambay Island SAC, and Grey Seal and Harbour Seal associated with Lambay Island SAC. MARA identified the potential for in-combination underwater-noise effects on these Qualifying Interests as requiring consideration at Stage 2.

Although a number of the identified marine projects have the potential to generate underwater noise, the potential for their effects to combine with those of the proposed SI works must be assessed with regard to the predicted acoustic effect ranges, the timing and duration of activities, the potential for spatial and temporal overlap, and the relevant site-specific conservation objectives. The proposed SI programme will be completed within a maximum period of 12 weeks and will not introduce any permanent source of underwater noise or other operational disturbance.

The existing high baseline level of activity within Dún Laoghaire Harbour has also been taken into account. While existing activity does not rule out additional disturbance from intrusive SI works, it provides context for considering the nature and magnitude of any additional temporary disturbance arising from the proposed works. The proposed SI works will be undertaken at discrete investigation locations and will stop following completion of the works.

The terrestrial planning applications identified in Table 5.5 have also been considered. These developments are primarily associated with land-based construction activities and potential temporary effects such as airborne noise, dust and accidental pollution. Given their nature, location and separation from the marine environment, no credible pathway has been identified by which these developments would combine with underwater noise generated by the proposed SI works to affect the marine mammal Qualifying Interests of Rockabill to Dalkey Island SAC, Codling Fault Zone SAC or Lambay Island SAC. Their contribution to in-combination effects through the underwater-noise pathway is therefore considered unlikely. Any other credible pathways would need to be considered where supported by the characteristics and location of the relevant development.

Potential in-combination effects arising from sediment mobilisation, deterioration in water quality and accidental pollution have also been considered. The proposed SI works will not involve dredging, reclamation, permanent habitat loss or operational discharges. Any sediment mobilisation associated with borehole drilling and vibrocore sampling is expected to be temporary and localised, while appropriate measures will be implemented to minimise the potential for accidental pollution. On the basis of the nature and scale of the proposed works, significant in-combination effects through these pathways are not anticipated, subject to the implementation of the relevant pollution-prevention measures and confirmation that no additional credible pathways arise from the other identified projects.

5.7 ROCKABILL TO DALKEY ISLAND SAC

Potential effects arising from the proposed site investigation works have been identified using the source-pathway-receptor model. The assessment considers the QIs of Rockabill to Dalkey Island SAC (003000), having regard to the nature, scale and location of the proposed works, the ecological sensitivities of the designated site and the potential impact pathways identified through the Appropriate Assessment Screening undertaken by MARA.

The principal impact pathway requiring further assessment is underwater noise disturbance and displacement of Harbour Porpoise [1351] arising from the marine site investigation activities. The potential source of underwater noise includes marine borehole drilling, Cone Penetration Testing (CPT), vibrocore sampling, vessel operation and associated marine plant. Multibeam bathymetric surveying will generate underwater sound, although the equipment operates at high frequencies and is non-intrusive.

Harbour Porpoise is highly mobile marine mammal, and individuals may occur within the wider waters surrounding Dún Laoghaire Harbour. The potential effects associated with underwater noise include temporary behavioural disturbance, avoidance or displacement, and, at sufficiently close range, auditory effects. These effects are assessed further below having regard to the conservation objectives of Rockabill to Dalkey SAC.

No operational effects are associated with the current proposal, as the project comprises temporary site investigation works only.

5.7.1 IDENTIFICATION OF EFFECTS ON QUALIFYING FEATURES

Rockabill to Dalkey Island SAC is located approximately 2.7km from the proposed site investigation works and is the closest of the three European Sites identified by MARA for Stage 2 Appropriate Assessment.

The proposed marine investigations, including borehole drilling, CPT and vibrocore sampling, together with associated vessel and plant operations, have the potential to generate temporary underwater noise. Multibeam bathymetric surveying will also generate underwater sound. Depending on proximity to the relevant noise source, this could result in temporary behavioural disturbance or avoidance, with auditory effects potentially occurring at closer range. Potential underwater noise effects on Harbour Porpoise are assessed in greater detail below.

5.7.1.1 HARBOUR PORPOISE [1351]

Harbour Porpoise is a highly mobile marine mammal that may occur within the wider waters surrounding Dún Laoghaire Harbour. The conservation objectives for the species seek to maintain its favourable conservation condition, including the maintenance of population size and distribution and the ecological conditions necessary to support the species.

The potential effect is associated with temporary exposure to underwater sound generated during the marine site investigation works. The magnitude and nature of any response will depend on factors including the source characteristics, duration and location of individual activities and the proximity of animals to the works.

The project-specific underwater noise assessment (Wave Dynamics, 2026) identified maximum predicted PTS and TTS onset ranges for Harbour Porpoise of 86m and 730m, respectively, during sonic drilling, together with an indicative behavioural disturbance range of up to 1.7km associated with sonic drilling and vibrocore sampling. These ranges do not extend into Rockabill to Dalkey Island SAC, located 2.7km from the proposed works at its closest point. However, Harbour Porpoise associated with the SAC may occur within the surrounding coastal waters and could therefore be exposed to temporary underwater noise during the investigations. The potential for such exposure to affect access to suitable habitat or result in disturbance is considered in the context of the duration, location and frequency of the works and the proposed marine mammal mitigation measures.

The works will be undertaken at discrete locations and will have a maximum overall duration of 12 weeks. Consequently, any potential disturbance will be temporary and spatially restricted, with no permanent source of underwater noise or barrier to marine mammal movement associated with the proposal.

5.7.2 ASSESSMENT AGAINST CONSERVATION OBJECTIVES

The assessment considers whether the temporary underwater noise generated by the proposed works could adversely affect the attributes and targets associated with Harbour Porpoise [1351]. The relevant attributes for Harbour Porpoise are access to suitable habitat and disturbance. The proposed works will not introduce an artificial barrier or other physical feature that could restrict access to suitable habitat or movement within the SAC.

The potential for temporary behavioural disturbance or avoidance of individual Harbour Porpoise will depend on their proximity to the active investigation works and on the acoustic characteristics and duration of the relevant activity. The predicted effect ranges identified in the Annex IV Species Risk Assessment should be considered alongside the temporary and spatially discrete nature of the works, the relevant conservation objectives and the mitigation measures identified.

Temporary behavioural responses or avoidance may occur in individual animals in the vicinity of active investigation works. The extent and significance of these effects must be assessed against the predicted noise exposure ranges and the effectiveness of the proposed mitigation measures Any noise-related effects are expected to cease when the relevant noise-generating activities cease.

The proposed activities will not result in permanent habitat loss or fragmentation and will not physically prevent Harbour Porpoise from moving through or using the wider marine environment. The temporary and spatially discrete nature of the works, together with the implementation of appropriate and confirmed marine mammal mitigation measures, is expected to limit the potential for prolonged or repeated exposure. The implications of

any overlapping noise sources or activities must also be considered in the in-combination assessment in Section 5.6.

Table 5.8: Assessment of Potential Effects on the Qualifying Interests of Rockabill to Dalkey Island SAC

Qualifying Interests	Conservation Objective	Potential Impact Pathway	Assessment
Harbour Porpoise [1351]	To maintain the favourable conservation condition of Harbour Porpoise within Rockabill to Dalkey Island SAC	Underwater Noise	Temporary underwater noise may result in auditory effects, behavioural disturbance or displacement of Harbour Porpoise. Wave Dynamics (2026) predicted maximum PTS and TTS ranges of 86m and 730m, respectively, and behavioural disturbance up to 1.7km. These ranges do not extend into the SAC (2.7km away), although individuals may occur closer to the works. Subject to confirmation and implementation of the mitigation measures in Section 5.5.4 and consideration of in-combination effects, no adverse effects on SAC integrity are predicted.

5.7.3 MITIGATION MEASURES

The mitigation measures outlined in Section 5.5.4 of this NIS will apply to the proposed site investigation works as a whole and therefore also apply in relation to Rockabill to Dalkey Island SAC.

These measures include minimising the duration of individual investigation activities, restricting works to the defined investigation locations, selecting lower-noise investigation methods where practicable, and minimising unnecessary vessel movements and equipment operation. Marine mammal mitigation measures will include the appointment of a suitably qualified Marine Mammal Observer (MMO), pre-start monitoring and the implementation of appropriate controlled commencement and soft-start procedures, in accordance with the project-specific underwater noise assessment (Wave Dynamics, 2026), the Annex IV Species Risk Assessment (OCSC, 2026) and relevant DAHG (2014) guidance.

No additional site-specific mitigation measures are considered necessary for Rockabill to Dalkey Island SAC beyond those identified in Section 5.5.4.

5.7.4 RESIDUAL IMPACT

The proposed works will not result in direct physical interaction with Dalkey Island SAC (003000) (2.7km), permanent habitat loss, fragmentation or an artificial barrier to the movement of Harbour Porpoise (*Phocoena phocoena*). The proposed works will therefore not affect the integrity of the Codling Fault Zone SAC (29.8km), in view of its conservation objectives,

Regardless it is the mobility of the considered mammal QIs species of that SAC and the potential for these to be impacted by the underwater noise associated with the proposed site investigation works. A number of mitigation measures have been identified which will result in no significant impacts of the conservation objectives of the QI Mammal Species identified within this NIS.

Table 5.9: Summary Assessment of Potential Effects on the Qualifying Interest of Rockabill to Dalkey Island SAC.

Qualifying Interest	Relevant Site-Specific Conservation Objective (SSCO)	Relevant Attributes and Targets	Potential Effects on Relevant SSCO Attributes and Targets	Mitigation	Residual Effect on Integrity
Harbour Porpoise [1351]	To maintain the favourable conservation condition of Harbour Porpoise within Rockabill to Dalkey Island SAC.	Access to suitable habitat: Number of artificial barriers. Species range within the site should not be restricted by artificial barriers to site use. Disturbance: Level of impact. Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site.	Temporary underwater noise generated by marine borehole drilling, CPT, vibrocore sampling, vessels, associated plant and MBES may result in temporary behavioural disturbance, avoidance or displacement and, at sufficiently close range, auditory effects. Potential effects are expected to be temporary and spatially restricted to the vicinity of active investigation works. The proposed works will not result in permanent habitat loss, fragmentation or a physical barrier to marine mammal movement. The significance of potential noise effects must be confirmed with reference to the final Underwater Acoustic Assessment and relevant conservation objectives.	The overall SI programme will not exceed 12 weeks, with individual investigations undertaken for the minimum duration necessary. Works will be restricted to defined investigation locations and the smallest practicable working footprint. Vessel and plant movements will be limited to those required for the works. Marine mammal monitoring and pre-commencement procedures will be implemented in accordance with the project-specific underwater noise assessment (Wave Dynamics, 2026), and Annex IV Species Risk Assessment (OCSC, 2026). Controlled commencement/soft-start procedures will be implemented where applicable. Equipment will be appropriately maintained and operated to minimise unnecessary noise generation. No impact piling, blasting, seismic airguns or other high-energy impulsive sources are proposed.	No adverse effect on the integrity of Rockabill to Dalkey Island SAC is anticipated. Any underwater noise effects will be temporary, spatially restricted and reversible. No significant or sustained effect on the population, distribution or habitat of Harbour Porpoise is anticipated.

5.8 CODLING FAULT ZONE SAC

Potential effects arising from the proposed site investigation works have been identified using the source-pathway-receptor model. The assessment considers the potential effects on the QIs of Codling Fault Zone SAC (003015), having regard to the site-specific conservation objectives for the SAC and the findings of the MARA Appropriate Assessment Screening.

The principal impact pathway requiring further assessment is underwater noise disturbance and displacement of Harbour Porpoise [1351] arising from the marine site investigation activities. The potential source of underwater noise includes marine borehole drilling, Cone Penetration Testing (CPT), vibrocore sampling, vessel operation and associated marine plant. Multibeam bathymetric surveying will generate underwater sound, although the equipment operates at high frequencies and is non-intrusive.

Harbour Porpoise is highly mobile marine mammal, and individuals may occur within the wider waters surrounding Dún Laoghaire Harbour. The potential effects associated with underwater noise include temporary behavioural disturbance, avoidance or displacement, and, at sufficiently close range, auditory effects. These effects are assessed further below having regard to the conservation objectives of Codling Fault Zone SAC.

No operational effects are associated with the current proposal, as the project comprises temporary site investigation works only.

5.8.1 IDENTIFICATION OF EFFECTS ON QUALIFYING FEATURES

The qualifying interests of Codling Fault Zone SAC [003015] have been assessed having regard to the nature, scale and location of the proposed site investigation works, the Site-Specific Conservation Objectives published by the NPWS, the ecological sensitivities of the qualifying interests, and the potential source–pathway–receptor linkages arising from the works.

Harbour Porpoise is considered further due to the potential for underwater noise generated by the proposed marine site investigation activities. The species is highly mobile and may occur outside the boundaries of the SAC. However, the proposed works are located approximately 29.8 km from the SAC, and there will be no direct physical interaction with the designated site.

The potential effects of underwater noise generated by marine borehole drilling, CPT, vibrocore sampling, vessel operation and associated plant are assessed in detail in Section 5.5. For Codling Fault Zone SAC, the assessment therefore focuses on whether the temporary and localised underwater noise generated by the proposed works could result in an effect on the Harbour Porpoise community associated with the SAC, having regard to the substantial separation distance between the works and the designated site.

5.8.1.1 HARBOUR PORPOISE [1351]

Harbour Porpoise [1351] is a QI of Codling Fault Zone SAC. The conservation objective is to maintain the favourable conservation condition of the species within the SAC.

The potential effect relevant to this QI is underwater noise disturbance associated with the proposed marine SI works. The characteristics and potential effects of underwater noise generated by the proposed activities, including behavioural disturbance, avoidance and auditory effects, are assessed in Section 5.5 and are not repeated in detail here.

Harbour Porpoise is considered further due to the potential for underwater noise generated by the proposed marine site investigation activities. The species is highly mobile and may occur outside the boundaries of the SAC. However, the proposed works are located approximately 29.8 km from the SAC, and there will be no direct physical interaction with the designated site.

The proposed works will be undertaken at discrete locations and will be temporary in nature. Any underwater noise generated will cease following completion of the relevant investigation activities. The works will not result in permanent habitat loss, fragmentation or an artificial physical barrier to the movement of Harbour Porpoise.

The maximum indicative behavioural disturbance range predicted by Wave Dynamics (2026) is 1.7km, while the greatest predicted auditory effect ranges for Harbour Porpoise are 86m for PTS and 730 m for TTS. These ranges are substantially smaller than the 29.8km separation distance between the proposed SI works and Codling Fault Zone SAC. Direct acoustic exposure within the SAC at the modelled effect thresholds is therefore not predicted. Nevertheless, Harbour Porpoise associated with the SAC may occur outside its designated boundary, and potential exposure within the wider marine environment is considered in assessing effects on the conservation objectives.

5.8.2 ASSESSMENT AGAINST CONSERVATION OBJECTIVES

The potential effects of the proposed site investigation works on the Qualifying Interests of Codling Fault Zone SAC have been assessed having regard to the Site-Specific Conservation Objectives for the SAC and the relevant attributes and targets associated with the species.

Particular consideration is given to the access to suitable habitat and disturbance of Harbour Porpoise. The proposed site investigation works will not introduce an artificial barrier that could restrict the movement of Harbour Porpoise or access to suitable habitat within the SAC.

In relation to disturbance, the potential for underwater noise generated by the proposed marine SI works to result in temporary behavioural disturbance, avoidance or auditory effects is considered in Section 5.5. The approximately 29.8 km separation distance, temporary and spatially discrete nature of the works, and absence of a permanent source of underwater noise are relevant to the assessment.

Table 5.10: Assessment of Potential Effects on the Conservation Objectives of Codling Fault Zone SAC

Qualifying Interest	Conservation Objective	Potential Impact Pathway	Assessment
Harbour Porpoise [1351]	To maintain the favourable conservation condition of Harbour Porpoise	Underwater Noise	Temporary underwater noise may result in auditory effects, behavioural disturbance or displacement of Harbour Porpoise. Wave Dynamics (2026) predicted maximum PTS and TTS ranges of 86m and 730m, respectively, and behavioural disturbance up to 1. km. These ranges do not extend into the SAC (2.7km away), although individuals may occur closer to the works. Subject to confirmation and implementation of the mitigation measures in Section 5.5.4 and consideration of in-combination effects, no adverse effects on SAC integrity are predicted.

5.8.3 MITIGATION MEASURES

The mitigation measures outlined in Section 5.5.4 of this NIS will apply to the proposed site investigation works as a whole and therefore also apply in relation to Codling Fault Zone SAC.

These measures include minimising the duration of individual investigation activities, restricting works to the defined investigation locations, selecting lower-noise investigation methods where practicable, and minimising unnecessary vessel movements and equipment operation. Marine mammal mitigation measures will include the appointment of a suitably qualified Marine Mammal Observer (MMO), pre-start monitoring and the implementation of appropriate controlled commencement and soft-start procedures, in accordance with the project-specific underwater noise assessment (Wave Dynamics, 2026), the Annex IV Species Risk Assessment (OCSC, 2026) and relevant DAHG (2014) guidance.

No additional site-specific mitigation measures are considered necessary for Codling Fault Zone SAC beyond those identified in Section 5.5.4.

5.8.4 RESIDUAL IMPACT

Following implementation of the mitigation measures described in Section 5.5.4, any underwater noise generated by the proposed site investigation (SI) works is expected to be temporary and spatially restricted to the vicinity of the activities.

The proposed works will not result in direct physical interaction with Codling Fault Zone SAC, permanent habitat loss, fragmentation or an artificial barrier to the movement of Harbour Porpoise (*Phocoena phocoena*). The proposed works will therefore not affect the integrity of the Codling Fault Zone SAC (29.8km), in view of its conservation objectives,

Regardless it is the mobility of the considered mammal QIs species of that SAC and the potential for these to be impacted by the underwater noise associated with the proposed site investigation works. A number of mitigation measures have been identified which will result in no significant impacts of the conservation objectives of the QI Mammal Species identified within this NIS.

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Table 5.11: Summary Assessment of Potential Effects on the Site-Specific Conservation Objectives and Integrity of the Codling Fault Zone SAC

Qualifying Interest	Relevant Site-Specific Conservation Objective (SSCO)	Relevant Attributes and Targets	Potential Effects on Relevant SSCO Attributes and Targets	Mitigation	Residual Effect on Integrity
[1351] Harbour Porpoise	To maintain the favourable conservation condition of Harbour Porpoise within Codling Fault Zone SAC.	Access to suitable habitat: Species range within the site should not be restricted by artificial barriers to site use. Disturbance: Human activities should occur at levels that do not adversely affect the Harbour Porpoise community at the site.	Temporary underwater noise generated by marine SI activities could result in temporary behavioural disturbance or avoidance. However, the proposed works are approximately 29.8 km from the SAC, will be temporary and spatially discrete, and will not create an artificial barrier or permanently restrict access to suitable habitat.	Minimise activity duration and restrict works to defined locations. Implement marine mammal monitoring, controlled commencement and soft-start procedures where applicable. Avoid unnecessary simultaneous equipment operation, maintain plant appropriately, and avoid high-energy impulsive activities.	None with mitigation measures.

5.9 LAMBAY ISLAND SAC

Potential effects arising from the proposed site investigation works have been identified using the source–pathway–receptor model. The assessment considers the potential for effects on the Qualifying Interests of Lambay Island SAC [000204] (21.7km), having regard to the site-specific conservation objectives for the SAC and the findings of the MARA Appropriate Assessment Screening.

MARA identified Harbour Porpoise, Grey Seal and Harbour Seal as Qualifying Interests requiring further assessment in relation to the potential for underwater noise disturbance and displacement. The principal impact pathway requiring consideration for Lambay Island SAC is therefore underwater noise disturbance associated with the proposed marine site investigation works. The detailed assessment of underwater noise generated by the proposed activities is provided in Section 5.6 of this NIS. The Lambay Island SAC assessment focuses on the potential for this pathway to affect the three relevant marine mammal Qualifying Interests, having regard to the approximately 21.7km separation distance between the proposed works and the SAC. The species is highly mobile and may occur outside the boundaries of the SAC.

The proposed site investigation works will be temporary, with the works expected to be completed within a period of less than 12 weeks. No operational phase is associated with the proposed works. There will be no permanent source of underwater noise, permanent habitat loss or permanent barrier to the movement of marine mammals arising from the proposed site investigation works.

5.9.1 IDENTIFICATION OF EFFECTS ON QUALIFYING FEATURES

The qualifying interests of Lambay Island SAC (000204) were assessed having regard to the nature, scale and location of the proposed site investigation works, the Site-Specific Conservation Objectives (SSCOs) published by the NPWS, the ecological sensitivities of the qualifying interest habitats, and the potential source–pathway–receptor linkages arising from the works.

Harbour Porpoise, Grey Seal and Harbour Seal are considered further due to the potential for underwater noise generated by the proposed marine site investigation activities. These species are mobile marine mammals and may occur outside the boundaries of the SAC. However, the proposed works are located approximately 21.7km from Lambay Island SAC, and there will be no direct physical interaction with the designated site.

The potential effects of underwater noise generated by marine borehole drilling, CPT, vibrocore sampling, vessel operation and associated plant are assessed in detail in Section 5.5. The assessment for Lambay Island SAC therefore focuses on whether underwater noise generated by the proposed works could affect Harbour Porpoise, Grey Seal and Harbour Seal associated with the SAC, having regard to the separation distance, predicted noise effect ranges and the temporary nature of the proposed activities.

5.9.1.1 HARBOUR PORPOISE [1351]

Harbour Porpoise [1351] is a Qualifying Interest of Lambay Island SAC. The conservation objective is to maintain the favourable conservation condition of Harbour Porpoise in Lambay Island SAC. The relevant attributes are Access to suitable habitat and Disturbance.

The potential effect relevant to this Qualifying Interest is temporary underwater noise disturbance associated with the proposed marine site investigation works. The potential characteristics and effects of underwater noise generated by the proposed activities, including behavioural disturbance, avoidance and auditory effects, are assessed in detail in Section 5.5 above.

The proposed works are located approximately 21.7 km from Lambay Island SAC. This separation distance is relevant to the assessment of potential effects but does not, on its own, demonstrate that effects can be excluded. The potential for underwater noise generated by the proposed works to affect Harbour Porpoise associated with the SAC must be considered. The species is highly mobile and may occur outside the boundaries of the SAC.

The proposed works will not introduce an artificial barrier that would restrict the species' range within the SAC. The relevant conservation objective for access to suitable habitat is therefore not expected to be adversely affected.

5.9.1.2 GREY SEAL [1364]

Grey Seal [1364] is a QI of Lambay Island SAC. The conservation objective is to maintain the favourable conservation condition of Grey Seal in Lambay Island SAC. The relevant attributes are access to suitable habitat, breeding behaviour, moulting behaviour, resting behaviour and disturbance.

The potential effect relevant to this QI is temporary underwater noise disturbance associated with the proposed marine site investigation works. Grey Seal may be present within the wider marine environment surrounding Lambay Island and may therefore have potential to interact with the underwater noise generated by the proposed works.

The proposed works are located approximately 21.7km from Lambay Island SAC. The potential effects of underwater noise, including behavioural disturbance and avoidance, are considered in Section 5.5. The separation distance, temporary duration and spatially discrete nature of the proposed works are relevant considerations but should not be used as the sole basis for excluding effects.

Wave Dynamics (2026) predicted maximum PTS and TTS onset ranges for Grey Seal and Harbour Seal of approximately 42m and 426m, respectively, during sonic drilling using the Southall et al. (2019) criteria. The NMFS (2024) sensitivity assessment identified maximum auditory injury and TTS ranges of 100m and 800m, respectively, for seals under the same scenario. These predicted ranges do not extend into Lambay Island SAC, located 21.7km from the proposed SI works. However, the potential for seals associated with the SAC to occur within the wider coastal waters surrounding the works remains relevant. Temporary disturbance of

individuals outside the SAC is therefore considered in relation to the species' use of supporting habitat and the relevant conservation objectives, including access to suitable habitat and disturbance.

The proposed works will not introduce an artificial barrier restricting access to suitable habitat, nor will they result in any direct interaction with breeding sites, moult haul-out sites or resting haul-out sites within the SAC. The relevant conservation objectives for these attributes are therefore not expected to be adversely affected.

5.9.1.1 HARBOUR SEAL [1365]

Harbour Seal [1365] is a QI of Lambay Island SAC. The conservation objective is to maintain the favourable conservation condition of Harbour Seal in Lambay Island SAC. The relevant attributes are access to suitable habitat, breeding behaviour, moulting behaviour, resting behaviour and disturbance.

The potential effect relevant to this Qualifying Interest is temporary underwater noise disturbance associated with the proposed marine site investigation works. The potential characteristics and effects of underwater noise are assessed in detail in Section 5.5 above.

The proposed works are located approximately 21.7 km from Lambay Island SAC. The potential for underwater noise to affect Harbour Seal associated with the SAC must be assessed. The separation distance, temporary duration and spatially discrete nature of the proposed works are relevant considerations but do not, in isolation, demonstrate that effects can be excluded. The species is highly mobile and may occur outside the boundaries of the SAC.

The proposed works will not introduce an artificial barrier restricting access to suitable habitat, nor will they result in any direct interaction with breeding sites, moult haul-out sites or resting haul-out sites within the SAC. The relevant conservation objectives for these attributes are therefore not expected to be adversely affected.

5.9.2 ASSESSMENT AGAINST CONSERVATION OBJECTIVES

The potential effects of the proposed site investigation works on Harbour Porpoise, Grey Seal and Harbour Seal have been assessed having regard to the Site-Specific Conservation Objectives for the SAC and the relevant attributes and targets associated with each Qualifying Interest.

For Harbour Porpoise, particular consideration is given to access to suitable habitat and disturbance. The proposed works will not introduce an artificial barrier that could restrict the species' range within the SAC. The potential for disturbance from underwater noise is assessed in Section 5.5 above. The NPWS target for disturbance is that human activities should occur at levels that do not adversely affect the Harbour Porpoise community at the site.

For Grey Seal and Harbour Seal, consideration is given to access to suitable habitat, breeding behaviour, moulting behaviour, resting behaviour and disturbance. The proposed works will not introduce an artificial barrier restricting access to suitable habitat, nor will they directly interact with breeding sites, moult haul-out sites or resting haul-out sites within the SAC.

Regardless it is the mobility of the considered mammal QIs species of this SAC and the potential for these to be impacted by the underwater noise associated with the proposed site investigation works. A number of mitigation measures have been identified which will result in no significant impacts of the conservation objectives of the QI Mammal Species identified within this NIS.

Table 5.12: Assessment of Potential Effects on the Conservation Objectives of Lambay Island SAC

Qualifying Interest	Conservation Objective	Potential Impact Pathway	Assessment
[1351] Harbour Porpoise	To maintain the favourable conservation condition	Underwater noise disturbance and displacement	Temporary underwater noise may result in auditory effects, behavioural disturbance or displacement of Harbour Porpoise, Grey Seal and Harbour Seal. Wave Dynamics (2026) predicted maximum PTS and TTS ranges of 86m and 730m for Harbour Porpoise, and 42m and 426m for seals, with indicative behavioural disturbance extending up to 1.7km. These ranges do not extend into Lambay Island SAC (21.7km away), although individuals may occur closer to the works. Subject to confirmation and implementation of the mitigation measures in Section 5.5.4 and consideration of in-combination effects, no adverse effects on SAC integrity are predicted.
[1364] Grey Seal			
[1365] Harbour Seal			

5.9.3 MITIGATION MEASURES

The mitigation measures outlined in Section 5.5.4 will apply to the proposed site investigation works as a whole and therefore also apply in relation to Lambay Island SAC.

These measures include minimising the duration of individual investigation activities, restricting works to the defined investigation locations, selecting lower-noise investigation methods where practicable, and minimising unnecessary vessel movements and equipment operation. Marine mammal mitigation measures will include the appointment of a suitably qualified Marine Mammal Observer (MMO), pre-start monitoring and the implementation of appropriate controlled commencement and soft-start procedures, in accordance with the project-specific underwater noise assessment (Wave Dynamics, 2026), the Annex IV Species Risk Assessment (OCSC, 2026) and relevant DAHG (2014) guidance.

No additional site-specific mitigation measures are considered necessary for Lambay Island SAC beyond those identified in Section 5.5.4.

5.9.4 RESIDUAL IMPACT

Following implementation of the proposed mitigation measures described in Section 5.5.4, underwater noise generated by the proposed SI works is expected to be temporary and spatially restricted.

The proposed works will not result in direct physical interaction with Lambay Island SAC, permanent habitat loss, fragmentation or the creation of an artificial barrier to the movement of Harbour Porpoise, Grey Seal or Harbour Seal. No direct interaction with breeding, moulting or resting sites within the SAC is anticipated. The proposed works will not affect the integrity of the Lambay Island SAC [000204], in view of its conservation objectives.

Regardless it is the mobility of the considered mammal QIs species of that SAC and the potential for these to be impacted by the underwater noise associated with the proposed site investigation works. A number of mitigation measures have been identified which will result in no significant impacts of the conservation objectives of the QI Mammal Species identified within this NIS.

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Table 5.13: Summary Assessment of Potential Effects on the Site-Specific Conservation Objectives and Integrity of the Lambay Island SAC

Qualifying Interest	Relevant Site-Specific Conservation Objective (SSCO)	Relevant Attributes and Targets	Potential Effects on Relevant SSCO Attributes and Targets	Mitigation	Residual Effect on Integrity
[1351] Harbour Porpoise	To maintain the favourable conservation condition of Harbour Porpoise.	Access to suitable habitat: Number of artificial barriers. Species range within the site should not be restricted by artificial barriers to site use. Disturbance: Level of impact. Human activities should occur at levels that do not adversely affect the Harbour Porpoise community at the site.	Temporary underwater noise could result in temporary behavioural disturbance or avoidance. However, the proposed works are approx. 21.7 km from the SAC, are temporary and spatially discrete, and will not create an artificial barrier restricting access to suitable habitat.	Minimise activity duration and restrict works to defined locations. Implement marine mammal monitoring, controlled commencement and soft-start procedures where applicable. Avoid unnecessary simultaneous equipment operation, maintain plant appropriately, and avoid high-energy impulsive activities.	None anticipated with mitigation measures put in place
[1364] Grey Seal	To maintain the favourable conservation condition of Grey Seal.	Access to suitable habitat: Number of artificial barriers. Species range within the site should not be restricted by artificial barriers to site use. Breeding behaviour: Breeding sites. The breeding sites should be maintained in a natural condition. Moulting behaviour: Moult haul-out sites. The moult haul-out sites should be maintained in a natural condition. Resting behaviour: Resting haul-out sites. The resting haul-out sites should be maintained in a natural condition. Disturbance: Level of impact. Human activities should occur at levels that do not adversely affect the Harbour Seal population at the site			
[1365] Harbour Seal	To maintain the favourable conservation condition of Harbour Seal.				

6 STATEMENT OF IMPACTS AND CONCLUSION OF NIS

The potential for the proposed site investigation works associated with the National Watersports Campus at Dún Laoghaire Harbour to adversely affect the Qualifying Interests (QIs) of European Sites has been assessed in this Natura Impact Statement. The assessment considers Rockabill to Dalkey Island SAC [003000], Codling Fault Zone SAC [003015] and Lambay Island SAC [000204], having regard to their Site-Specific Conservation Objectives and relevant attributes and targets.

The proposed works are temporary and spatially discrete, comprising marine and terrestrial boreholes, Cone Penetration Testing (CPT), vibrocore sampling and multibeam bathymetric surveying. No dredging, reclamation or permanent structures are proposed, and no permanent loss of or alteration to qualifying interest habitats within the European Sites is anticipated.

The principal potential impact pathway is underwater noise disturbance and displacement of marine mammal QIs. The assessment considers Harbour Porpoise [1351] associated with all three SACs, and Grey Seal [1364] and Harbour Seal [1365] associated with Lambay Island SAC. Potential sources include drilling, CPT, vibrocore sampling, vessel operation and associated plant. The duration and localised nature of the works, and their separation distances from the European Sites, have been considered. Any seabed disturbance is expected to be temporary and confined to discrete investigation locations.

A project-specific underwater noise assessment was undertaken by Wave Dynamics (2026) to evaluate potential auditory and behavioural effects associated with the proposed SI activities. The assessment identified the greatest predicted auditory effect ranges during sonic drilling, with Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS) onset ranges of 86m and 730m, respectively, for Harbour Porpoise. The corresponding ranges for Grey Seal and Harbour Seal were approximately 42m and 426m using the Southall et al. (2019) criteria.

The proposed SI works will be temporary, with underwater noise generated intermittently at discrete investigation locations. The assessment has considered the predicted acoustic exposure, duration and spatial extent of disturbance, the mobility and ecology of the relevant marine mammal QIs and the availability of suitable supporting marine habitat. Mitigation measures have been identified to minimise the potential for auditory effects and behavioural disturbance, including the appointment of a qualified Marine Mammal Observer (MMO), pre-start monitoring, appropriate soft-start procedures, selection of lower-noise investigation methods where practicable and measures to minimise unnecessary vessel movements and underwater noise generation.

The predicted acoustic effect ranges do not extend into the boundaries of the three European Sites considered in this NIS. However, marine mammals associated with these SACs may occur within supporting marine habitat outside the designated site boundaries, including within Dublin Bay and the coastal waters surrounding

Dún Laoghaire Harbour. The potential for temporary disturbance or displacement of these individuals has therefore been considered in assessing implications for the relevant conservation objectives.

Following implementation of the proposed mitigation and environmental control measures, residual effects are expected to be temporary, localised and reversible, with no permanent habitat loss, fragmentation or lasting barrier to marine mammal movement.

The final conclusion of this NIS on the basis of best scientific knowledge and objective scientific information, is that the proposed works will not affect the integrity of Rockabill to Dalkey Island SAC [003000], Codling Fault Zone SAC [003015] or Lambay Island SAC [000204], in view of their conservation objectives.

Regardless it is the mobility of the considered mammal QIs species of those three SACs and the potential for these to be impacted by the underwater noise associated with the proposed site investigation works. A number of mitigation measures have been identified which will result in no significant impacts of the conservation objectives of the QI Mammal Species identified within this NIS.

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8 VERIFICATION

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APPENDIX A

ROCKABILL TO DALKEY ISLAND SACSITE SYNOPSIS

SITE SYNOPSIS

Site Name: Rockabill to Dalkey Island SAC

Site Code: 003000

This site includes a range of dynamic inshore and coastal waters in the western Irish Sea. These include sandy and muddy seabed, reefs, sandbanks and islands. This site extends southwards, in a strip approximately 7 km wide and 40 km in length, from Rockabill, running adjacent to Howth Head, and crosses Dublin Bay to Frazer Bank in south Co. Dublin. The site encompasses Dalkey, Muglins and Rockabill islands.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1170] Reefs
[1351] Harbour Porpoise (*Phocoena phocoena*)

Reef habitat is uncommon along the eastern seaboard of Ireland due to prevailing geology and hydrographical conditions. Expansive surveys of the Irish coast have indicated that the greatest resource of this habitat within the Irish Sea is found fringing offshore islands which are concentrated along the Dublin coast. A detailed survey of selected suitable islands has shown areas with typical biodiversity for this habitat both intertidally and subtidally. Species recorded in the intertidal included *Fucus spiralis, Fucus serratus, Pelvetia canaliculata, Ascophyllum nodosum, Semibalanus balanoides* and *Necora puber*. Subtidally, a wide range of species include *Laminaria hyperborea, Flustra folicacea, Alaria esculenta, Halidrys siliquosa, Pomatocereos triqueter, Alcyonium digitatum, Metridium senile, Caryophyllia smithii, Tubularia indivisa, Mytilus edulis, Gibbula umbilcalis, Asterias rubens,* and *Echinus esculentus*. These reefs are subject to strong tidal currents with an abundant supply of suspended matter resulting in good representation of filter feeding fauna such as sponges, anemones and echinoderms.

The area selected for designation represents a key habitat for the Annex II species Harbour Porpoise within the Irish Sea. Population survey data show that porpoise occurrence within the site boundary meets suitable reference values for other designated sites in Ireland. The species occurs year-round within the site and comparatively high group sizes have been recorded. Porpoises with young (i.e. calves) are observed at favourable, typical reference values for the species. Casual and effort-related sighting rates from coastal observation stations are significant for the east coast of Ireland and the latter appear to be relatively stable across all seasons. The selected site contains a wide array of habitats believed to be important for Harbour Porpoise including inshore shallow sand and mudbanks and rocky reefs scoured by strong current flow. The site also supports Common Seal and Grey Seal,

for which terrestrial haul-out sites occur in immediate proximity to the site. Bottle-nosed Dolphins has also occasionally been recorded in the area. A number of other marine mammals have been recorded in this area including Minke, Fin and Killer Whales and Risso's and Common Dolphins.

The coastal environment of Co. Dublin is a very significant resource to birds with some nationally and internationally important populations. Of particular note in this site are the large number of terns (Arctic, Common and Roseate) known to use Dalkey Island as a staging area (approx. 2,000) after breeding. Other seabirds commonly seen include Kittiwake, Razorbill, Guillemot, Puffin, Fulmar, Shag, Cormorant, Manx Shearwater, Gannet and gulls.

This site is of conservation importance for reefs, listed on Annex I, and Harbour Porpoise, listed on Annex II, of the E.U. Habitats Directive.

APPENDIX B

CODLING FAULT ZONE SAC SITE SYNOPSIS

SITE SYNOPSIS

Site Name: CODLING FAULT ZONE

SAC Site Code: 003015

Codling Fault Zone is a Special Area of Conservation located around 24 km east of Howth Head, Co. Dublin within the Irish Sea. The length of the site is approximately 7 km and 5 km wide at the greatest extent. The water depth at the site ranges from about 80 to 100 m.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1180] Submarine structures made by leaking gases
[1351] Harbour Porpoise (*Phocoena phocoena*)

Structures made by leaking gases in the marine environment can form two described habitat types: Bubbling Reefs and Structures within Pockmarks. The habitat recognised in the Irish Sea conforms to the definition of bubbling reefs. The typical carbonate mounds and accreted slabs have been detected using data generated as a result of seismic and multi-beam bathymetric surveying and by observation using remotely operated vehicles. These mounds are formed by anaerobic bacteria oxidising methane to drive their metabolism. The reduction phase of this chemical reaction within the bacterial cell produces a very small amount of waste carbonate. These processes can only occur in anoxic mud away from the overlying oxygenated sea water where there is a consistent presence of methane. Over a prolonged period these metabolic residues can build-up to the extent that they form what are known as methane-derived authigenic carbonates which can protrude above the mud in the surrounding waters. These hard structures formed by biological processes are generally composed of carbonate cement (mainly calcite (high in Magnesium), dolomite, and aragonite). The Codling Fault Zone has been documented to have in excess of 23 seep mounds generated as a result of currently active gas emissions from deep gas reserves. The specific processes that form these structures mean that this habitat type is not commonly found. At this site, these features tend to form elongated structures, from 60-80 metres in width, raised a couple of metres proud of the surrounding seabed, which trace the movement of the strike/slip fault zone and can extend up to several hundred metres in length.

Drop-down camera surveys have noted the occurrence of a range of fauna. The hard structures associated with Submarine structures made by leaking gases tend to form solid substrates which allow the growth of species not usually found in the surrounding mud and sand. Dense beds of hydroids, including Nemertesia sp.,

Hydrallmania falcata and Tubularia indivisa, are widely recorded, particularly along the edge of features. A wide variety of anemones occur; these include the cerianthid Cerianthus lloydii on soft overlying sediment, and among others, Alcyonium digitatum, Sagartia elegans, Urticina felina, and Actinothoe sphyrodeta on harder ground, principally on pavement areas. In the crevices, overhangs and between rocks the edible crab, Cancer pagurus is very abundant, while squat lobsters, Munida sp. and lobsters Homarus gammarus also occur. A variety of sponges, including the boring- sponge Cliona celata and the lace sponge Clathrina coriacea are present, as is the bryozoan Flustra foliacea. The feather star Antedon bifida is commonly seen in crevices and under overhangs. The fish species recorded included Trisopterus luscus (Bib) and Chiroplophis ascanii (Yarrell's blenny). None of these species would typically occur in the surrounding habitat of mobile sand.

This site is of high conservation importance, due to the presence of the Habitats Directive Annex I habitat Submarine structures made by leaking gases and its associated fauna.

APPENDIX C

LAMBAY ISLAND SAC SITE SYNOPSIS

SITE SYNOPSIS

Site Name: Lambay Island SAC

Site Code: 000204

Lambay Island is a large (250 ha) inhabited island lying 4 km off Portrane on the north Co. Dublin coast. It is privately owned and is accessible by boat from Rogerstown Quay. The island rises to 127 m and is surrounded by steep cliffs on the north, east and south slopes. These cliffs contain good diversity in height, slope and aspect. The west shore is low-lying and the land slopes gently eastwards to the summit in the centre of the island. The underlying geology is varied, but is dominated by igneous rocks (of andesitic type) and ash. Also present are shales and limestones of Silurian origin, limestone conglomerates, and shales from the Old Red Sandstone era. The bedrock is exposed on the fringing cliffs and in rocky outcrops; elsewhere it is overlain by varying depths of glacial drift.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1170] Reefs
[1230] Vegetated Sea Cliffs
[1364] Grey Seal (*Halichoerus grypus*)
[1365] Common (Harbour) Seal (*Phoca vitulina*)
[1351] Harbour Porpoise (*Phocoena phocoena*)

Much of the western third of the island is intensively farmed (mostly pasture), and there are small areas of parkland, deciduous and coniferous woodland, buildings, walled gardens and the harbour. The rest of the island is a mixture of less intensively grazed land, rocky outcrops, patches of Bracken (*Pteridium aquilinum*) and Bramble (*Rubus fruticosus* agg.), and cliff slopes with typical maritime vegetation e.g. Thrift (*Armeria maritima*), Sea Campion (*Silene vulgaris* subsp. *maritima*), Rock Sea-spurrey (*Spergularia rupicola*) and Spring Squill (*Scilla verna*). Some sheltered gullies have small areas of scrub woodland dominated by Elder (*Sambucus nigra*).

Lambay Island is flanked by extensive areas of reef habitat. Typical species in the intertidal include *Ascophyllum nodosum*, *Fucus* spp., *Laminaria* spp., *Dynamena pumila*, *Actinia equina*, *Littorina littorea*, *L. saxatilis*, *Patella vulgata* and *Semibalanus balanoides*. In the subtidal reef the following algal species are frequently encountered - *Palmaria palmata*, *Cystoclonium purpureum*, *Delesseria sanguinea*, *Membranoptera alata*, *Hypoglossum hypoglossoides*, *Chorda filum*, *Laminaria saccharina* and *Halidrys siliquosa*. Invertebrate species commonly recorded include the typical shallow reef species

Obelia geniculata, Alcyonium digitatum, Caryophyllia smithii, Pomatoceros triqueter, Helcion pellucidum, Balanus crenatus, Echinus esculentus and *Asterias rubens*.

Lambay supports the principal breeding colony of Grey Seal on the east coast of Ireland, numbering 196-252 seals, across all ages. It also contains regionally significant numbers of Common Seal, of which up to 47 individuals have been counted at the site. Grey Seals and Common Seals occur year-round and the island's intertidal shorelines, coves and caves are used by resting and moulting seals.

A herd of Fallow Deer (approx. 80) roams the higher parts of the island, and a small number of wallabies (approx. 10) survive in a feral state. This island may also hold the last Irish population of the Ship Rat, a species listed in the vertebrate Red Data Book.

Lambay Island is internationally important for its breeding seabirds. The most numerous species is the Guillemot, with almost 52,000 individuals on the cliffs. Razorbills (3,646 individuals), Kittiwakes (5,102 individuals), Herring Gulls (2,500 pairs), Cormorants (605 pairs), Shags (1,164 pairs), Puffins (235 pairs), and small numbers of Great and Lesser Black-backed Gulls also breed (all figures from 1995). Between 1991 and 1995 Fulmar numbers varied between 573-737 pairs. There is a small colony (<100 pairs) of the nocturnal Manx Shearwater on the island and up to 20 pairs of Common Terns have bred in recent years. A few Black Guillemots have been recorded on Lambay, but it is not clear if they breed. A pair of Peregrines are known to breed on the island.

In winter the most notable bird species on Lambay Island is the Greylag Goose with numbers peaking at 1,000, though in recent winters there has been a decline to 400-700 individuals. There is also a small wintering flock of Barnacle Goose (up to 50), and recently Brent Goose (up to 100) have started to occur regularly. Small numbers of Great Northern Diver and Red-throated Diver are also present in winter.

An intensive survey of the natural history of Lambay Island was carried out in 1906 and published in the Irish Naturalist. A similar, comparative survey has been carried out in the early 1990s. With this background, Lambay Island is an excellent site for studies of marine biology, terrestrial fauna and flora, geology, geomorphology and ecology.

The island has been maintained as a wildlife sanctuary by its owners and no threats are envisaged should the present land use continue. Rodents may be causing some damage to the populations of burrow-nesting seabirds.

Lambay Island has good examples of vegetated sea cliffs, a habitat listed on Annex I of the E.U. Habitats Directive, and these cliffs hold internationally important populations of seabirds. The site is also of conservation importance for the populations of Grey Seal and Common Seal, species listed on Annex II of this Directive, that it supports.

APPENDIX D

UNDERWATER NOISE ASSESSMENT – WAVE DYNAMICS

WAVE DYNAMICS

ACOUSTICS MONITORING ENVIRONMENTAL

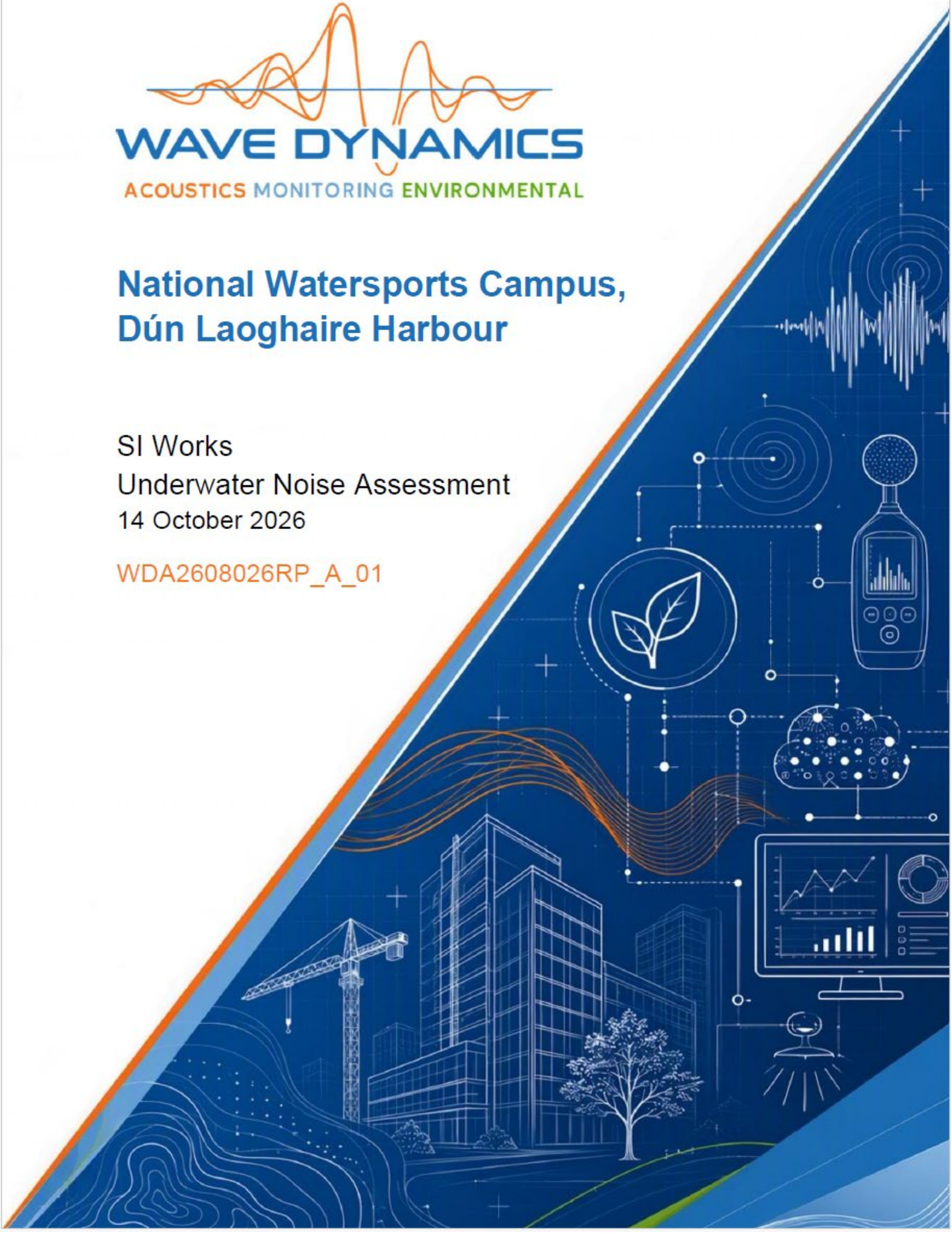
National Watersports Campus, Dún Laoghaire Harbour

SI Works

Underwater Noise Assessment

14 October 2026

WDA2608026RP_A_01



Notice

This document is intended only for the use of Dún Laoghaire-Rathdown County Council and its design team (Reddy Architecture & Urbanism and O'Connor Sutton Cronin). The information and document are specifically for the site investigation works for the National Watersports Campus, Dún Laoghaire Harbour, Co. Dublin and should not be reproduced, edited or copied in any form without the permission of Wave Dynamics. This document relates only to the underwater noise aspects of the site investigation works, on the basis of the information available at the date of issue; the main construction and operational phases of the National Watersports Campus are not covered. Wave Dynamics assumes no responsibility to any other party arising in connection with this document and its contents.

Document Information

Project Name:	National Watersports Campus, Dún Laoghaire Harbour
Address:	Dún Laoghaire Harbour, Dún Laoghaire, Co. Dublin
Project Number	WDA2608026
Report Title	SI Works Underwater Noise Assessment
Client	Dún Laoghaire-Rathdown County Council

Document History

Revision	Status	Description	Author	Reviewer	Issue Date
A	Issued	SI Works Underwater Noise Assessment	 James Cousins	 Sean Rocks	14/10/2026

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Executive Summary

Wave Dynamics (WD) was engaged by Dún Laoghaire-Rathdown County Council (DLRCC), through Reddy Architecture & Urbanism and O'Connor Sutton Cronin (OCSC), to undertake an underwater noise assessment of the proposed site investigation (SI) works for the National Watersports Campus (NWC), Dún Laoghaire Harbour, Co. Dublin. The SI works are the subject of Maritime Usage Licence application MUL250023, for which the Maritime Area Regulatory Authority (MARA) Appropriate Assessment (AA) screening has screened in harbour porpoise, grey seal and harbour seal for Stage 2 AA on the basis of underwater noise. This report supports the Natura Impact Statement (NIS) response to MARA and provides the underwater noise mitigation requirements for the SI specification.

Underwater noise. Using conservative published source levels, logarithmic spreading and a stationary-animal exposure model, the predicted injury (PTS) ranges for marine mammals extend to 86 m and temporary threshold shift (TTS) ranges to 730 m for harbour porpoise exposed to a full day of sonic drilling; ranges for seals, dolphins and minke whale are smaller and those for rotary coring are negligible. No injury, hearing-effect or behavioural threshold is predicted to be exceeded within the Rockabill to Dalkey Island SAC (2.7 km), Lambay Island SAC or Codling Fault Zone SAC. With the DAHG (2014) mitigation set out in Section 6.1 (Marine Mammal Observer, 500 m Monitored Zone, 30-minute pre-start watch, daylight starts, ramp-up where the plant allows) and a preference for rotary coring over water, the risk of injury to marine mammals is negligible and residual disturbance is temporary, local and reversible. No seasonal restriction is considered necessary on noise grounds.

Basis of assessment. This report is based on the information available at the date of issue, in advance of the SI tender returns and the appointment of the SI contractor. The plant, drilling methods, vessel, programme and working hours have been assumed from the licence application and OCSC's information. The SI works themselves will provide the bathymetric, seabed and ground data for the main project, so no project-specific in-water data is available yet. The assessment should be reviewed when the contractor's plant, methods and programme are confirmed (Section 1.1).

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1 Introduction

Wave Dynamics (WD) has been appointed to undertake an underwater noise assessment of the proposed Site Investigation (SI) works for the National Watersports Campus (NWC), Dún Laoghaire Harbour, Co. Dublin. The SI works are proposed by Dún Laoghaire-Rathdown County Council (DLRCC) under Maritime Usage Licence application MUL250023 and are designed by O'Connor Sutton Cronin (OCSC). This report covers the SI works phase only; the main construction phase and the operational phase of the NWC are not included.

This report covers:

- an underwater noise impact assessment of the marine SI activities on marine mammals, prompted by the MARA Appropriate Assessment (AA) screening determination for MUL250023, which screened in harbour porpoise, grey seal and harbour seal for Stage 2 AA;
- marine mammal mitigation (MMO, pre-start monitoring, soft start, Monitored Zone, PAM) and whether a seasonal restriction is necessary; and
- underwater noise mitigation and monitoring requirements for the SI specification and the contractor's method statements.

Appendix A outlines a glossary of the acoustic terminology used in this report. Appendix B lists the standards, guidance and published sources referred to.

1.1 Basis of Assessment and Limitations

This report has been prepared on the basis of the information available at the date of issue, which is listed in Section 2.3. The SI contractor has not yet been appointed, and no project-specific bathymetric survey data exists for the SI locations (multibeam bathymetric surveying forms part of the SI programme itself). The plant, drilling methods, vessel, programme and working hours have therefore been assumed from the MUL250023 application and OCSC's layout, using conservative published source levels.

The SI works will provide the bathymetric, seabed and ground information for the main NWC project. This means that the in-water conditions that govern underwater sound propagation (water depth, seabed sediment type and ground conditions) are not yet known for the SI locations, and the propagation model in Section 5.2 uses empirical shallow-water coefficients rather than site-specific inputs.

The following items are to be confirmed when the information becomes available, and the assessment reviewed accordingly:

- the SI contractor's plant list, drilling methods (sonic, cable percussion or rotary), vessel and jack-up details, and whether positions will be worked concurrently;
- the programme, working hours and the duration of works at each position;
- underwater source levels for sonic drilling and CPT, for which no published measurements were found (Section 5.1), by contractor data or by the monitoring described in Section 6.2;
- any noise limits, conditions or management measures attached to the MUL licence or required by DLRCC or the harbour company.

Wave Dynamics should be consulted if the extent, methods, locations or timing of the SI works change. The findings relate to the SI works only and should not be applied to the construction of the NWC, which will require a separate assessment.

1.2 Statement of Competence

The assessment and this report were prepared by James Cousins, Managing Director | Principal Consultant with Wave Dynamics, who has extensive experience in assessing noise impacts. His qualifications include a BSc (Hons) in Construction Management and Engineering, a Pg Cert in Construction Law, the Diploma in Acoustics and Noise Control (Institute of Acoustics) and an IOA Certificate of Competence in Building Acoustic Measurements. James is a member of Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA) and is the current SITRI Chairman.

The peer review was completed by Sean Rocks, Director | Senior Consultant, who has experience of numerous planning stage assessments. Sean's qualifications include a BEng (Hons) in Mechanical and Manufacturing Engineering, the Diploma in Acoustics and Noise Control (Institute of Acoustics), the IOA Certificate of Competence

in Environmental Noise Measurement and SITRI certification as a sound insulation tester. Sean is a member of Engineers Ireland and the Institute of Acoustics.

2 Proposed Site Investigation Works

2.1 Overview

The SI works will gather data on seabed conditions, subsurface geology, sediment characteristics and bathymetry to inform the design of the NWC. They cover five Maritime Usage Licence (MUL) areas within and adjacent to Dún Laoghaire Harbour, totalling approx. 26,289 m² (OCSC drawings D866-OCSC-ZZ-ZZ-DR-S-0011 to 0013, P01). The OCSC MUL area numbering is used in this report; the MARA screening report refers to the same areas as Zones A–E, with Zone A (The Gut Slipway, Salthill) approx. 250 m north-west of the harbour and Zones B–E within the harbour. The areas and SI locations are shown in Figures 1 to 3.

Table 1: MUL areas and SI locations (OCSC layout, Sheets 02–04)

MUL area	Location	Area (m²)	SI activities (OCSC layout)
1	The Gut Slipway (Salthill; MARA Zone A, outside the harbour)	4,896	BH01–BH02, CPT01–CPT02, TP01–TP02, DP01–DP02 (Sheet 02)
2	Coal Harbour Watersports	13,967	BH03–BH11 and BH17–BH19, CPT03–CPT11, VC01–VC04, TP03–TP04, slit trenches ST01–ST02; BH22, TP05, DP03–DP04 on the adjoining land (Sheet 03)
3	High Performance Pontoon	666	BH12–BH13, CPT12–CPT13 (Sheet 03)
4	Events Building – Pier (Carlisle Pier)	2,321	BH20–BH21; multibeam echosounder survey area (MARA Zone E) (Sheet 04)
5	Carlisle Event Slipway	4,439	BH14–BH16, CPT14–CPT16, VC05–VC06, TP06, DP05 (Sheet 04)

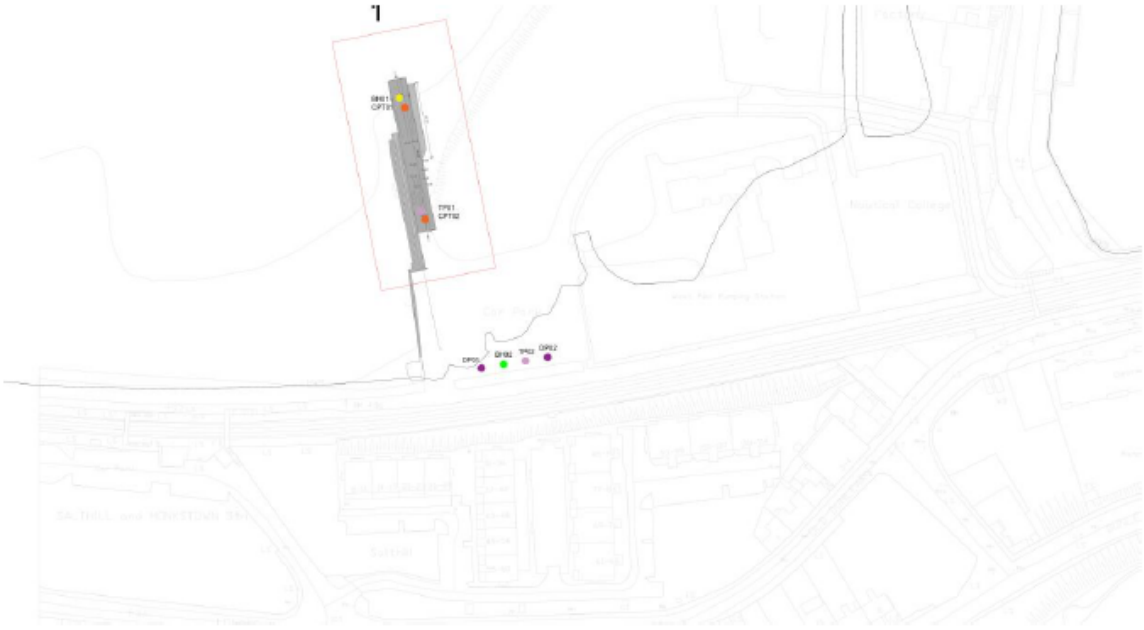


Figure 1: MUL Area 1 – The Gut Slipway, Salthill (OCSC Sheet 02, D866-OCSC-ZZ-ZZ-DR-S-0011 P01)

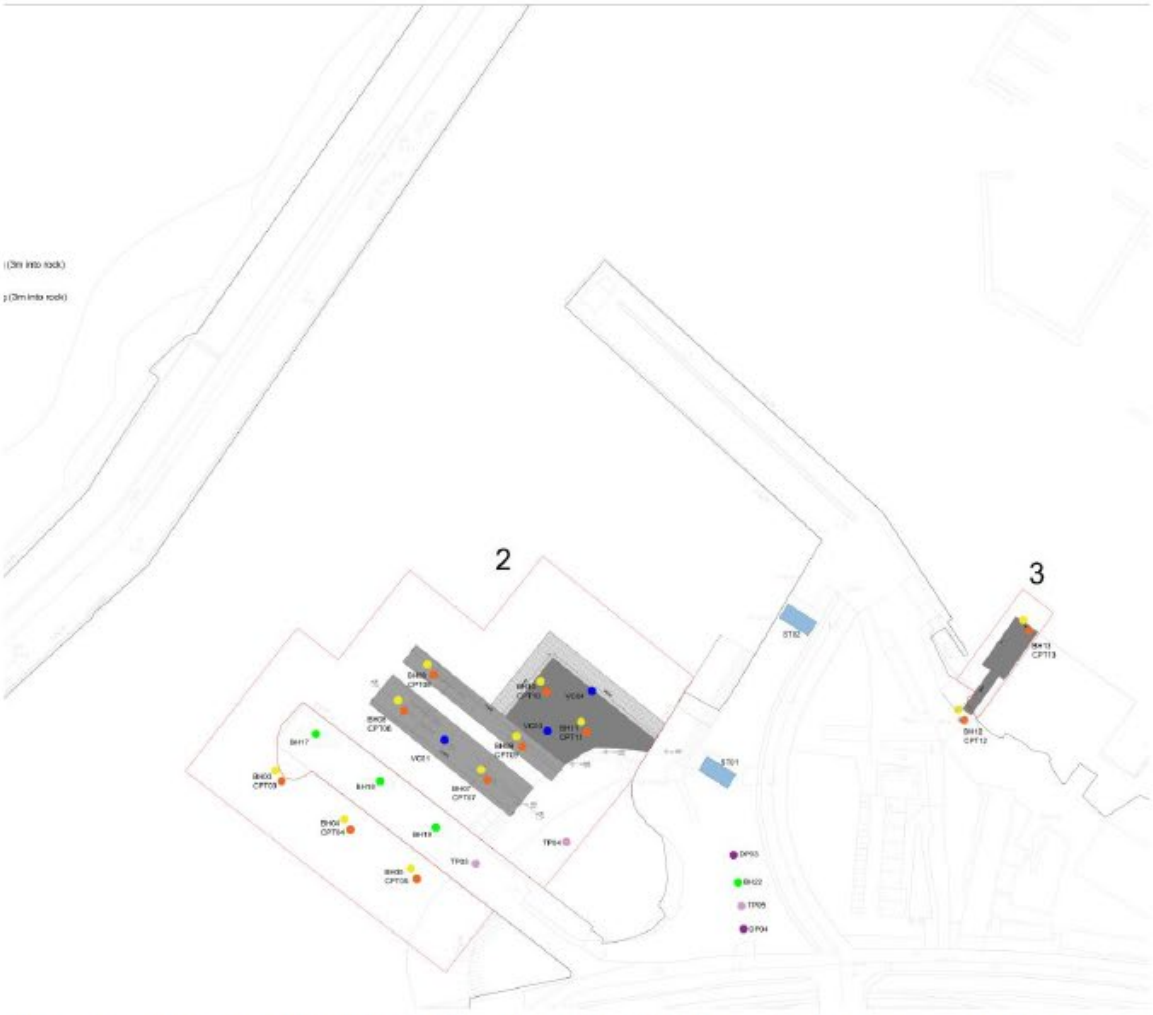


Figure 2: MUL Areas 2 and 3 – Coal Harbour Watersports and High Performance Pontoon (OCSC Sheet 03, D866-OCSC-ZZ-ZZ-DR-S-0012 P01)

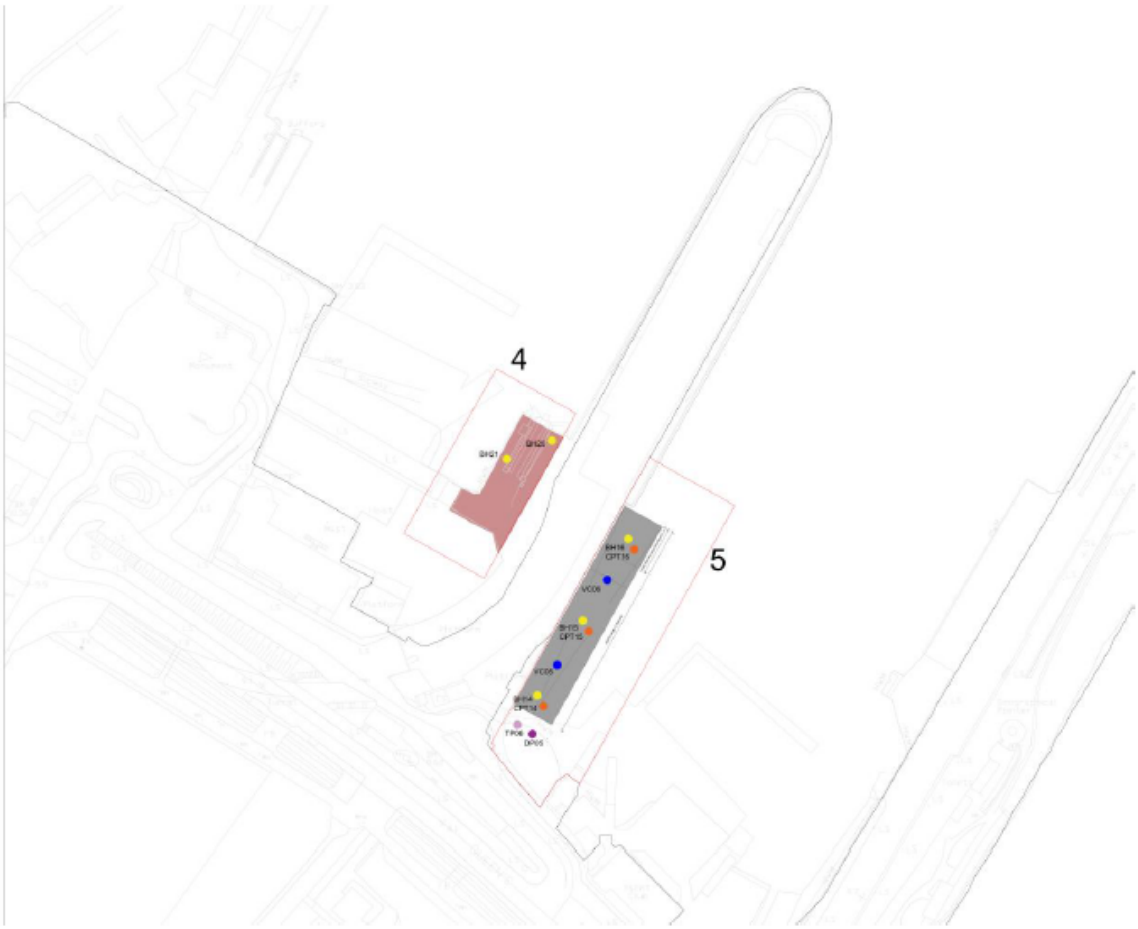


Figure 3: MUL Areas 4 and 5 – Events Building Pier and Carlisle Event Slipway (OCSC Sheet 04, D866-OCSC-ZZ-ZZ-DR-S-0013 P01)

The MARA screening report describes the marine SI programme (Table 1 of that report) as follows; the licence term recommended by MARA is one year, with a maximum works duration of 12 weeks:

Table 2: SI activities (MUL250023 screening report)

Activity	Quantity	Details
Boreholes	22	Sonic drilling or cable percussion boring, followed by rotary core drilling 3 m into rock. Max. diameter 200 mm.
Cone penetration tests (CPT)	16	Quasi-static push of an instrumented cone
Vibrocores	6	Vibrating core barrel driven into seabed sediment
Multibeam echosounder (MBES)	Zone E	400–700 kHz
Survey platform	1	Compact SI jack-up barge (12 m × 15 m, 28 m legs) with support vessel
Land / intertidal works	–	Trial pits, slit trenches and dynamic probes (OCSC layout)

Boreholes beyond the 2024 high water mark will be drilled from the jack-up barge. Land and intertidal locations may be worked from tracked rigs at low water. The exact programme depends on weather windows, tides, procurement and vessel availability. Where a position is worked in the dry at low tide, there is no direct underwater

noise path. The assessment assumes, as a worst case, that all marine positions are worked through the water column and that each source operates for the full daily operating time in Table 5.

2.2 Working Hours

No working hours have been fixed for the SI works. The assessment assumes daytime working, with each source operating for the full daily operating time in Table 5. In accordance with DAHG (2014), noisy over-water activities are to start only in daylight and in conditions of effective visual monitoring (Section 6.1).

2.3 Information Used

- OCSC Site Investigation Layout, Sheets 02–04, D866-OCSC-ZZ-ZZ-DR-S-0011 / 0012 / 0013, S2-P01, 6 August 2026, and the SI CAD files issued on 7 October 2026;
- MARA Appropriate Assessment Screening and Determination Report, MUL250023, 4 August 2026;
- OCSC Annex IV Species Risk Assessment (D866-OCSC-ZZ-ZZ-RE-YE-801-S2-P01) and the draft NIS extracts issued by OCSC on 7 October 2026; and
- OCSC correspondence of 7 October 2026 confirming the information available and not yet available (no project-specific bathymetry; marine mammal mitigation being developed in the NIS; no seasonal restriction yet identified).

3 Sensitive Receptors

3.1 Marine Receptors

The MARA AA screening (MUL250023, 4 August 2026) screened in the following European sites for Stage 2 AA on the basis of potential underwater noise impacts from the SI works:

Table 33: European sites screened in for underwater noise (MARA, 2026)

European site	Distance from nearest MUL area (km)	Qualifying interests (underwater noise)
Rockabill to Dalkey Island SAC (003000)	2.7	Harbour porpoise (*Phocoena phocoena*) (1351)
Lambay Island SAC (000204)	21.7	Harbour porpoise (1351), grey seal (*Halichoerus grypus*) (1364), harbour seal (*Phoca vitulina*) (1365)
Codling Fault Zone SAC	29.8	Harbour porpoise (1351)

All cetaceans are also strictly protected under Annex IV of the Habitats Directive wherever they occur. Bottlenose dolphin, common dolphin and minke whale are recorded in Dublin Bay. Grey and harbour seals regularly use Dún Laoghaire Harbour. Marine mammals are therefore assessed as present in the harbour, not only within the SACs.

4 Assessment Criteria

4.1 Underwater Noise – Marine Mammals

Injury (permanent threshold shift, PTS) and temporary threshold shift (TTS) onset criteria from Southall et al. (2019), numerically equivalent to NMFS (2018), are adopted. These are the criteria used in Wave Dynamics' previous underwater assessments and in current Irish and UK practice. Cumulative sound exposure levels are frequency-weighted using the Southall et al. (2019) auditory weighting functions for each hearing group. Following NMFS practice, the weighting adjustment is applied at a single frequency of 2.5 kHz for continuous sources and 2 kHz for impulsive sources; this is conservative for the harbour porpoise (VHF) and dolphin (HF) groups because the SI sources are dominated by low-frequency energy, to which those groups are less sensitive.

Table 44: Marine mammal PTS and TTS onset criteria (Southall et al., 2019)

Hearing group (species)	Non-impulsive PTS / TTS – weighted SEL_{cum} (dB re 1 μPa^2s)	Impulsive PTS / TTS – weighted SEL_{cum} (dB re 1 μPa^2s)	Impulsive PTS / TTS – unweighted SPL_{peak} (dB re 1 µPa)
VHF – very high frequency (harbour porpoise)	173 / 153	155 / 140	202 / 196
HF – high frequency (bottlenose and common dolphin)	198 / 178	185 / 170	230 / 224
LF – low frequency (minke whale)	199 / 179	183 / 168	219 / 213
PCW – phocid carnivores in water (grey and harbour seal)	201 / 181	185 / 170	218 / 212

SEL_{cum} in dB re 1 μPa^2s; SPL_{peak} in dB re 1 µPa. Hearing groups and thresholds from Southall et al. (2019) Tables 5–7.

NMFS published a revision of its technical guidance in 2024 (Version 3.0), which renames PTS as auditory injury (AUD INJ), adopts the Southall (2019) hearing-group names and revises some thresholds and weighting parameters (for example, the non-impulsive injury threshold for harbour porpoise rises from 173 to 181 dB weighted SEL_{cum} and that for seals falls from 201 to 195 dB weighted SEL_{cum}). Irish and UK practice continues to follow Southall et al. (2019). The effect of the 2024 revision on the predicted ranges is reported as a sensitivity check in Section 5.3.

For behavioural disturbance, the NMFS Level B thresholds of 120 dB re 1 µPa SPL_{rms} (continuous sources) and 160 dB re 1 µPa SPL_{rms} (impulsive sources) are used to give indicative ranges. These thresholds are precautionary and take no account of context, habituation or existing noise in a working harbour.

4.2 Irish Guidance – DAHG (2014)

The Department of Arts, Heritage and the Gaeltacht (DAHG, 2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters requires a risk assessment for coastal and marine works and sets out standard mitigation. For drilling and other coastal works (Section 4.3.2) this comprises a qualified and experienced Marine Mammal Observer (MMO), a 500 m Monitored Zone, 30 minutes of pre-start monitoring with no marine mammals in the zone, a start only in daylight with effective visual monitoring, and a repeat of the pre-start monitoring after any break of more than 30 minutes. For piling (Section 4.3.3) the Monitored Zone is 1,000 m and a ramp-up (soft start) of 20–40 minutes is required where the output exceeds 170 dB re 1 µPa SPL_{peak} at 1 m. The guidance does not require passive acoustic monitoring (PAM) for this class of works and regards PAM as a supplement to, not a replacement for, visual monitoring. The mitigation in Section 6.1 follows this guidance.

5 Underwater Noise Assessment

5.1 Source Levels

No contractor-specific source data is available yet. Source levels for each SI technique have been taken from published measurements of comparable plant, using the upper end of each range so that the assessment is conservative. The levels are to be refined once the SI contractor and plant are confirmed.

Table 55: Underwater source levels adopted

Source	Type	Source level at 1 m (dB)	Basis	Daily operating time assumed (h)
Rotary core drilling	Non-impulsive	145 dB re 1 µPa SPL_{rms}	Erbe & McPherson (2017): 142–145 dB re 1 µPa rms at 1 m, measured from a jack-up in 7–13 m water	8
Sonic drilling	Non-impulsive	187 dB re 1 µPa SPL_{rms}	No published measurements found; vibrocore level adopted as a conservative proxy (resonant casing vibration)	8
Cable percussion boring	Impulsive	200 dB SPL_{peak} (assumed); 160 dB re 1 µPa²s SEL_{ss}	SEL_{ss} at the upper end of SPT measurements, 151–160 dB re 1 µPa²s at 1 m (Erbe & McPherson, 2017); SPL_{peak} conservatively assumed; 30 blows/min	8
CPT	Non-impulsive	175 dB re 1 µPa SPL_{rms}	No published measurements found; conservative assumption (rig hydraulics and push). NIRAS (2025) judges CPT noise not significant	4
Vibrocore	Non-impulsive	187 dB re 1 µPa SPL_{rms}	187.4 dB re 1 µPa rms at 1 m (Reiser et al., 2011), as adopted by NIRAS (2025) for the Danish Energy Agency and in UK EPS licence applications	1 (6 cores × 10 min)
Support vessel / jack-up positioning	Non-impulsive	170 dB re 1 µPa SPL_{rms}	Survey vessel on DP 165 dB (NIRAS, 2025); vessel transits 150.5–181.3 dB (Jiménez-Arranz et al., 2020)	2
Multibeam echosounder	Non-impulsive	–	400–700 kHz: above the hearing range of all marine mammals; screened out	–

Rotary drilling, vibrocore, cable percussion (SEL) and vessel levels were checked against the published literature on 11 and 13 October 2026 (Appendix B). No published measurements were found for sonic drilling or CPT, so those values remain conservative assumptions to be confirmed with the SI contractor or by the monitoring described in Section 6.2.

5.2 Propagation Model

Underwater sound propagation from each source has been predicted with a logarithmic spreading model with empirical shallow-water coefficients, in accordance with the NPL Good Practice Guide for Underwater Noise Measurement (2014):

$$L(R) = L(1\ m) - 17.91 \log10(R) - 0.00523\ (R - 1)$$

where L(R) is the received level at range R (m) from the source and L(1 m) is the source level at 1 m. The geometric spreading coefficient (17.91) and absorption coefficient (0.00523 dB/m) are averages of measurements at shallow-water construction sites (11 and 9 measurements respectively), presented at the Institute of Fisheries Management conference (2013). Water depths across the MUL areas are 0–14 m. The model does not account for the screening provided by the East and West Piers: sound reaching the open bay and the SACs from the inner-harbour areas must leave through the harbour mouth (approx. 230 m wide), about 1 km from the works, so predictions beyond the harbour are conservative. For The Gut Slipway (Area 1, Salthill), which opens directly onto Dublin Bay, the model applies without this screening.

Simple spreading models do not account for frequency-dependent absorption, bathymetry, seabed type or sound speed profiles. No project-specific bathymetric or sediment data is available for the SI locations (the SI works will provide it). The coefficients adopted were derived from measurements in comparable shallow coastal waters and, with the upper-bound source levels used, give a proportionate and precautionary estimate for a works-stage assessment.

Cumulative exposure assumes a stationary animal at a fixed range for the full daily operating time of each source, with Southall et al. (2019) frequency weighting (Section 4.1). This is very conservative, because marine mammals are mobile and are expected to move away from a disturbing source.

5.3 Results – Marine Mammals

Table 66: Predicted PTS and TTS impact ranges – marine mammals

Source	Harbour porpoise (VHF) PTS / TTS range (m)	Dolphins (HF) PTS / TTS range (m)	Minke whale (LF) PTS / TTS range (m)	Seals (PCW) PTS / TTS range (m)
Rotary core drilling (incl. rock coring)	<1 m / 5 m	<1 m / <1 m	<1 m / 4 m	<1 m / 3 m
Sonic drilling	86 m / 730 m	9 m / 105 m	63 m / 581 m	42 m / 426 m
Cable percussion boring	13 m / 82 m	<1 m / 5 m	11 m / 71 m	6 m / 43 m
Cone penetration test (CPT)	13 m / 156 m	1 m / 16 m	9 m / 115 m	6 m / 78 m
Vibrocore	28 m / 304 m	3 m / 35 m	20 m / 231 m	13 m / 159 m
Support vessel / jack-up positioning	5 m / 59 m	<1 m / 6 m	3 m / 43 m	2 m / 29 m

Distances from the source within which the PTS or TTS onset threshold may be exceeded (stationary animal, weighted SEL_{cum} over the daily operating time; impulsive results also checked against SPL_{peak}).

For all sources, PTS ranges are confined to the immediate vicinity of the works. The largest is 86 m, for harbour porpoise exposed to sonic drilling for a full 8-hour day. TTS ranges for porpoise extend to 730 m for sonic drilling, 304 m for vibrocoring, 156 m for CPT and 82 m for cable percussion boring. Rotary coring produces negligible ranges (under 5 m). For seals, PTS ranges are below 45 m and TTS ranges below 430 m. All PTS and TTS ranges lie well within the 2.7 km separation to the Rockabill to Dalkey Island SAC, and largely within the harbour basin.

Sensitivity – NMFS (2024). The ranges were recalculated with the NMFS (2024) Version 3.0 thresholds and weighting functions. The harbour porpoise ranges reduce (sonic drilling 68 m injury / 616 m TTS), while the seal and dolphin ranges increase: the largest 2024 ranges are for seals exposed to a full day of sonic drilling, at approx. 100 m (auditory injury) and 800 m (TTS), and 37 m / 383 m for dolphins. All ranges remain within the harbour and

its approaches and well inside the 2.7 km separation to the nearest SAC, so the conclusions and the mitigation are unchanged under either set of criteria.

5.4 Results – Behavioural Disturbance

Table 77: Indicative behavioural disturbance ranges

Source	Criterion (dB re 1 µPa SPL_{rms})	Indicative disturbance range (m)
Rotary core drilling	120	24
Sonic drilling / vibrocore	120	1,700
CPT	120	724
Support vessel / jack-up	120	456
Cable percussion boring	160 (impulsive; est. 170 dB SPL_{rms} at 1 m)	4

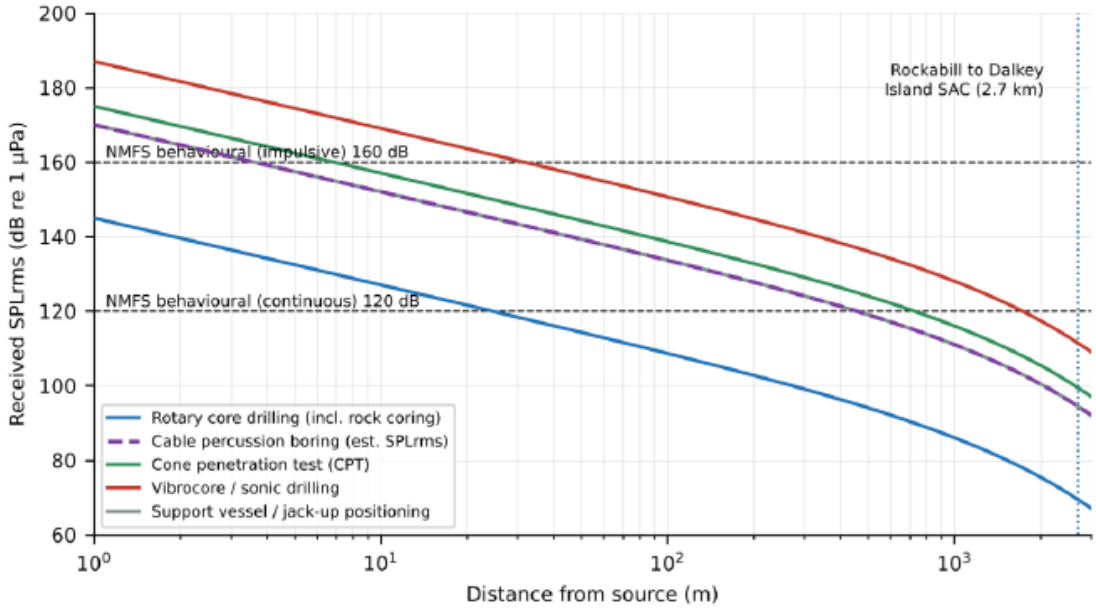


Figure 44: Predicted received SPL_{rms} against distance for the SI sources

Behavioural responses (avoidance, changes in foraging) may occur up to approx. 1.7 km from sonic drilling or vibrocoring under the precautionary 120 dB SPL_{rms} criterion. The CPT (724 m) and support vessel (456 m) ranges follow directly from the conservative source levels assumed in Table 5 and the same 120 dB re 1 µPa criterion; CPT is a quasi-static push and NIRAS (2025) judges its noise not significant, and the support vessel is comparable to the ferries, workboats and marina traffic already operating in the harbour, so the realistic disturbance ranges for these sources are expected to be considerably smaller. In practice, the enclosed harbour and existing vessel traffic, including ferries, offshore wind support vessels and marina traffic, mean underwater ambient levels in the harbour are likely to approach or exceed 120 dB for much of the time. For comparison, measurements during rotary drilling in a working dock at Birkenhead recorded background levels of approx. 110–132 dB SPL_{rms}, and drilling noise could not be distinguished from background at 85 m and beyond (DC10147, 2019). Any response would be temporary and local, lasting only while the activity takes place. No underwater baseline noise measurements were undertaken. Predicted levels at the SAC boundary (2.7 km) are approx. 111 dB SPL_{rms} for the loudest sources, below the behavioural criterion.

5.5 Discussion

With conservative source levels and a stationary-animal exposure model, injury (PTS) to marine mammals could only occur within tens of metres of the louder SI activities (sonic drilling, cable percussion and vibrocoring). The risk is readily managed with the standard DAHG (2014) mitigation in Section 6.1. Temporary hearing effects (TTS) and behavioural disturbance are limited to the harbour and its immediate approaches, and to Dublin Bay off The Gut and Salthill. Effects are short term and reversible, and no PTS, TTS or behavioural threshold is predicted to be exceeded within any screened-in SAC.

Selecting the drilling method gives the greatest control: rotary coring produces impact ranges one to two orders of magnitude smaller than sonic or percussive methods. Working intertidal positions in the dry at low water removes the underwater noise path entirely.

5.6 Seasonal Restrictions

Given that the predicted injury ranges are confined to within approx. 100 m of the works, that TTS and disturbance ranges are contained within the harbour and its approaches, that the works at any one position last days, and that the DAHG (2014) mitigation will be applied, a seasonal restriction is not considered necessary on underwater noise grounds.

6 Mitigation and Management Measures

6.1 Underwater Noise – DAHG (2014) Mitigation

The following measures are proposed. They follow DAHG (2014) Section 4.3.2 (drilling and other coastal works), with the piling ramp-up requirement applied by analogy where the plant allows.

- Prefer rotary coring over sonic or cable percussion methods for over-water boreholes where ground conditions allow. Work intertidal positions in the dry at low water where possible.
- Appoint a qualified and experienced Marine Mammal Observer (MMO) (JNCC-recognised training or equivalent, with the sea-time experience set out in DAHG (2014) Section 4.1) for all over-water sonic drilling, cable percussion boring, vibrocoring and CPT. The MMO is dedicated to observation and has no other duties.
- Establish a Monitored Zone of 500 m radius around the source (DAHG 2014, Section 4.3.2) and carry out a 30-minute pre-start watch from an elevated position with an unobstructed view. Do not start if a marine mammal is observed within the zone; wait until it has left and 30 minutes have passed with no further sightings.
- Start noisy activities only in daylight and in conditions of effective visual monitoring (sea state 4 or less; detection is considerably better at sea state 3 or less). Once an activity has started under these conditions it may continue into darkness or deteriorating visibility without stopping, in accordance with DAHG (2014). A new start in darkness or poor visibility requires either a 30-minute pre-start watch under suitable conditions or, if agreed with NPWS, pre-start monitoring by passive acoustic monitoring (PAM) by a trained operator. PAM is not otherwise required for these works.
- Where the plant allows, ramp up (soft start) percussive and vibratory sources (cable percussion, sonic drilling, vibrocore) over 20–40 minutes, by analogy with the DAHG piling requirement (Section 4.3.3). Ramp-up is not required by DAHG (2014) for rotary drilling.
- After any break in noisy activity of more than 30 minutes, repeat the 30-minute pre-start watch (and ramp-up where applicable).
- Where two sources operate at the same time at different locations, each requires its own MMO and Monitored Zone.
- The MMO is to keep records on the standard DAHG forms, and a full MMO and mitigation report (DAHG 2014, Appendix 7) is to be submitted to NPWS after completion.
- Minimise vessel transit speeds and engine running time while the jack-up is positioned.

6.2 Monitoring

The assessment does not identify a specific requirement for underwater noise monitoring during the SI works. However, once the final plant schedule, construction methodology and works programme have been confirmed, the assessment should be reviewed to verify that the adopted assumptions remain representative.

Where the confirmed plant, working locations, operating durations or concurrent activities differ materially from those assessed, the calculations should be updated and an appropriate monitoring programme developed.

Monitoring may also be undertaken during the initial use of the principal noise-generating plant to verify the predicted levels and confirm the effectiveness of the proposed mitigation measures. Any monitoring requirements should be agreed with the project team and incorporated into the contractor's final method statement.

7 Conclusions

Wave Dynamics was engaged to assess underwater noise from the proposed site investigation works for the National Watersports Campus, Dún Laoghaire Harbour, in support of the MUL250023 licence application and the Natura Impact Statement. The findings are as follows.

The underwater noise assessment, using conservative literature source levels, logarithmic spreading and a stationary-animal model, predicts PTS ranges of up to 86 m and TTS ranges of up to 730 m for harbour porpoise (sonic drilling). Ranges for seals, dolphins and minke whale are smaller, and those for rotary coring are negligible; under the NMFS (2024) sensitivity check the largest ranges are approx. 100 m (injury) and 800 m (TTS) for seals. No injury, hearing-effect or behavioural threshold is predicted to be exceeded within the Rockabill to Dalkey Island SAC (2.7 km), Lambay Island SAC or Codling Fault Zone SAC. With DAHG (2014) mitigation (MMO, 500 m Monitored Zone, 30-minute pre-start watch, daylight starts and ramp-up where the plant allows) and a preference for rotary coring over water, the risk of injury to marine mammals is negligible, and residual disturbance is temporary, local and reversible. No seasonal restriction is considered necessary on noise grounds.

The assessment is based on the information available at the date of issue, before the SI tender returns, and on empirical propagation coefficients rather than site-specific bathymetry, which the SI works themselves will provide. The source levels assumed for sonic drilling and CPT and the contractor's plant and programme are to be confirmed, and monitoring during the initial use of the principal plant (Section 6.2) can verify the source levels on site.

The underwater noise mitigation and monitoring requirements in Section 6 should be included in the contractor's method statements. This report should be reviewed when the contractor's plant, methods and programme are confirmed.

Appendix A – Glossary of Terms

Table 88: Glossary of acoustic terms

Term	Definition
dB	Decibel – the scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and a reference pressure; for underwater sound the reference pressure is 1 micropascal (1 µPa).
Hertz (Hz)	The unit of frequency, in cycles per second.
dB re 1 µPa	Underwater sound pressure level in decibels relative to a reference pressure of 1 micropascal (1 µPa). Underwater levels are not directly comparable with airborne levels in dB re 20 µPa.
SPL_{rms}	Root-mean-square sound pressure level (dB re 1 µPa) – the time-averaged level of a continuous or intermittent sound, used for behavioural response criteria and for continuous (non-impulsive) sources.
SPL_{peak}	Zero-to-peak sound pressure level (dB re 1 µPa) – the maximum absolute instantaneous sound pressure of an impulsive sound such as a hammer blow.
Sound Exposure Level (SEL)	The level of the time-integrated squared sound pressure (dB re 1 μPa^2s), normalised to one second. SEL_{ss} is the single-strike (single-event) sound exposure level.
Cumulative Sound Exposure Level (SEL_{cum})	The sound exposure accumulated over a stated period (typically 24 hours or the daily operating time), obtained by summing the SEL of all events or of continuous operation.
Weighted SEL_{cum}	SEL_{cum} filtered with the auditory weighting function for a marine mammal hearing group (Southall et al., 2019), so that energy outside the group's most sensitive frequency range is given less weight.
Temporary Threshold Shift (TTS)	A temporary, recoverable reduction in hearing sensitivity following exposure to sound. Repeated TTS may lead to permanent threshold shift.
Permanent Threshold Shift (PTS)	A permanent, unrecoverable reduction in hearing sensitivity following exposure to high sound levels; classed as auditory injury (termed AUD INJ in the 2024 NMFS guidance).
Marine mammal hearing groups	Southall et al. (2019) functional hearing groups: LF (low-frequency cetaceans, e.g. minke whale), HF (high-frequency cetaceans, e.g. bottlenose and common dolphin), VHF (very high-frequency cetaceans, e.g. harbour porpoise) and PCW (phocid carnivores in water, e.g. grey and harbour seal).
Impulsive / non-impulsive sound	Impulsive sounds are brief, broadband transients with rapid rise times (e.g. percussive hammer blows); non-impulsive (continuous) sounds have no such rapid rise (e.g. drilling, vibrocoring, vessel engines).
Transmission loss / propagation loss	The reduction in sound level between the source and a receiver due to geometric spreading and absorption, expressed in dB.
Marine Mammal Observer (MMO)	A qualified and experienced observer who carries out pre-start monitoring and records marine mammal sightings and mitigation actions in accordance with DAHG (2014).
Passive Acoustic Monitoring (PAM)	Detection of vocalising marine mammals using hydrophones, used to supplement visual observation in darkness or poor visibility.
Ramp-up / soft start	A gradual increase in source output at the start of operations to allow marine mammals to move away before full power is reached.

Appendix B – References

The standards, guidance documents and published sources referred to in this report are listed below.

Department of Arts, Heritage and the Gaeltacht (2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. DAHG, Dublin.

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