Uisce Éireann

Liscannor Maritime Usage Licence (MUL)

Supporting Information for Screening for Appropriate Assessment and Natura Impact Statement

Brendan Dickerson and Aisling Hearty

AQUAFACT Ref: P17851
January 2026
COMMERCIAL IN CONFIDENCE

Client: **Uisce Éireann**

Address: **Colvill House,**

24-26 Talbot St,

Mountjoy,

Dublin, D01 NP86

Reference no: **P18559**

Date of issue: **January 2026**

AQUAFACT contact: **Aisling Hearty**

Position: **Principal Ecologist**

E-mail: [redacted]

Telephone: [redacted]

Website: **www.aquafact.ie**

Address: **AQUAFACT International Services Ltd,**

9A Liosban Business Park,

Tuam Road,

Galway,

Ireland.

H91 K120

Registered in Ireland: **No. 493496**

Tax Reference Number: **9773384O**

Tax Clearance Number: **559674**

Approval Sheet

Client	Uisce Éireann
Report Title	Liscannor Maritime Usage Licence - Screening for Appropriate Assessment and Natura Impact Statement
Job Number	P18559
Report Status	Final
Issue Date	January 2026

Rev	Status	Issue Date	File Name	Author(s)	Approved By
1	Draft	November 2025	P18559_Liscannor_MUL_Draft	BD	AH
2	Draft	December 2025	P18559_Liscannor_MUL_Draft_V5	BD	AH, AL
3	Final	January 2026	P18559_Liscannor_MUL_Final	BD	AH, AL

AQUAFACT
APEM Group

Table of Contents

List of Figures

List of Tables

1. Introduction

1.1. Overview

This Supporting Information for Screening for Appropriate Assessment (SISAA) has been prepared by AQUAFACT – APEM Group (AQUAFACT) to provide relevant information to enable the competent authority (MARA) to carry out a Stage 1: Screening for AA of the proposed marine and intertidal survey activitiess associated with the Lahinch & Ennistymon Wastewater Treatment Plant (WWTP) Project ('the Project') as required under Article 6(3) obligations of the Habitats Directive. MARA's functions and decision-making in this context are guided by the Maritime Area Planning Act 2021 and related statutory instruments, which establish its responsibility for assessing licence applications in line with European and national environmental law. This report considers the potential effects of the Project on European sites.

The objective of the Project is to undertake a programme of marine environmental and geotechnical surveys to inform the design and assessment of a new wastewater treatment plant outfall in Liscannor Bay. The marine survey activities will include geophysical investigations (multibeam echo sounder, side-scan sonar, sub-bottom profiler), bathymetric mapping, grab sampling, boreholes/coring, and water quality sampling over an area of 287.4 Ha (**Figure 1-1**). These surveys are required to characterise the receiving environment, identify potential constraints, and provide the baseline data necessary for the future consenting and detailed design of the WWTP outfall and diffuser. Full details of the Proposed Maritime Usage are described in Attachment 3.1 which accompanies this Maritime Usage Licence (MUL).

Surveys in Area B (**Figure 1-2**) will include targeted freshwater surveys will be undertaken over an area of 6430.28 m^2 in the Cullenagh River. These will involve the collection of water quality samples at multiple locations and times, to assess key physical, chemical, and biological parameters and characterise the baseline status of the receiving environment upstream of the proposed outfall location.

The surveys are temporary, small in scale, and essential to ensure that the future WWTP outfall can be designed, sited, and constructed in a way that minimises environmental impacts, supports compliance with EU and national legislation, and protects the ecological integrity of Liscannor Bay and nearby European sites. The indicative survey locations, including proposed marine access points, are shown in **Figure 1-1** and **Figure 1-2**.

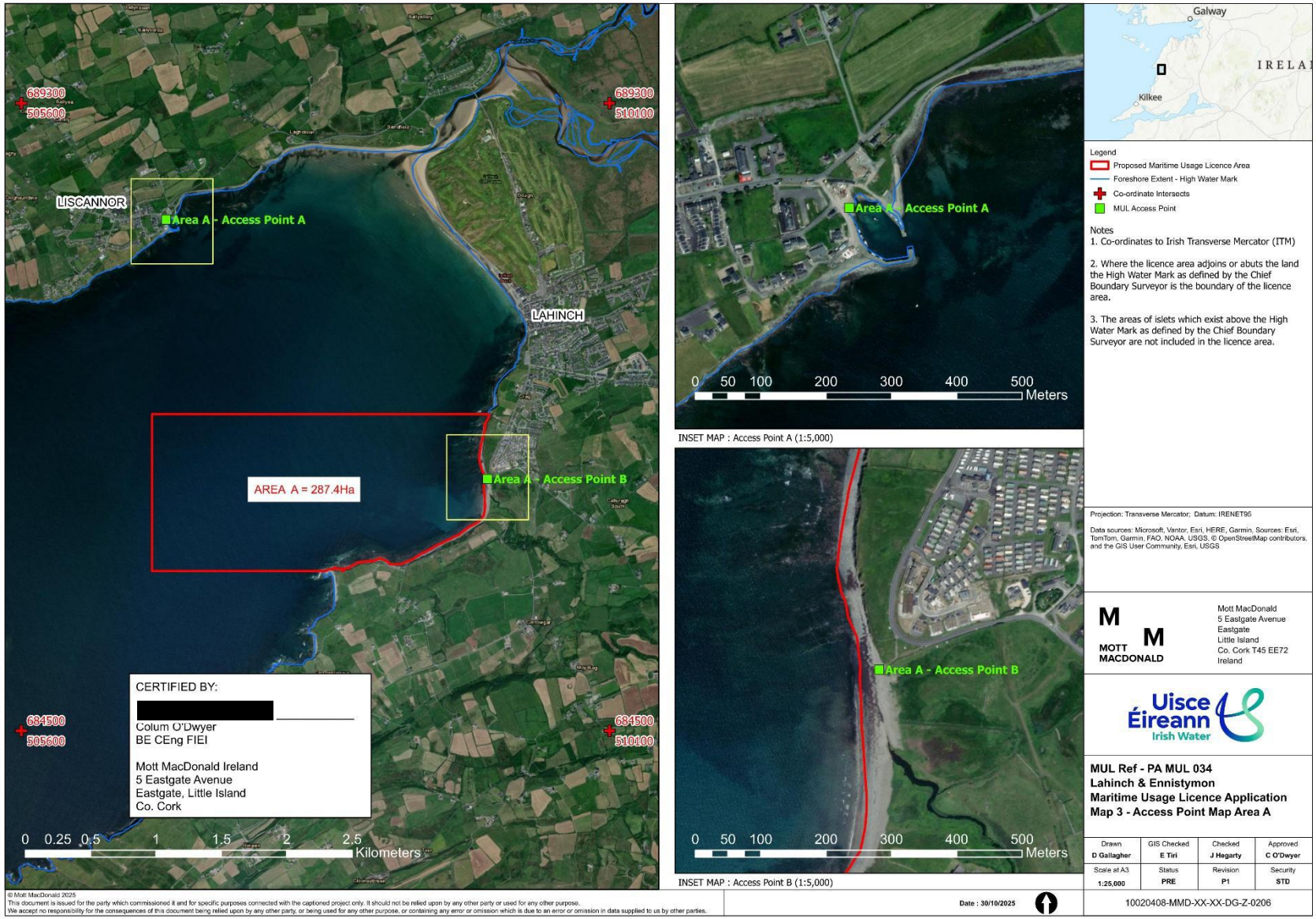

Figure 1-1: Proposed survey area (Area A) and access points, Liscannor Bay, Co. Clare.

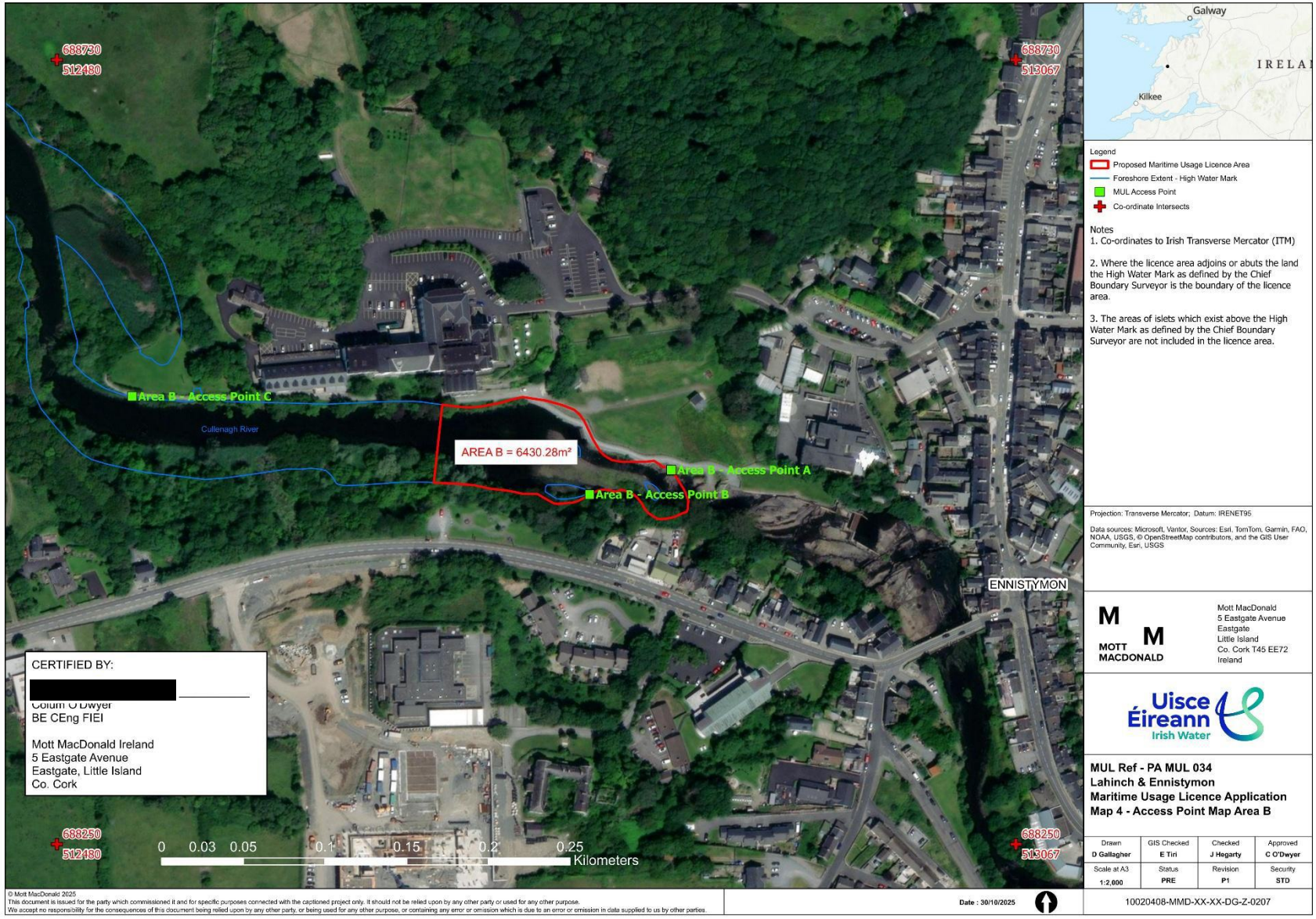

Figure 1-2: Proposed survey area (Area B) and access points, Liscannor Bay, Co. Clare

1.2. Appropriate Assessment Process

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) provides the legal framework for biodiversity conservation across the European Union. Together with the Birds Directive (2009/147/EC), it establishes a network of protected sites designated as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). In Ireland, these are collectively referred to as European sites, which form part of the pan-European Natura 2000 network (OPR, 2021).

Each European site is designated for specific habitats and/or species. For SACs, these are referred to as the site's Qualifying Interests (QIs), while for SPAs they are referred to as Special Conservation Interests (SCIs) (OPR, 2021). In this report, these are collectively described as the site's conservation features.

Site-specific conservation objectives are published for each European site and set out the conditions necessary to maintain or restore these features at favourable conservation status. These objectives provide the benchmark against which likely significant effects are assessed in the AA process.

The Habitats Directive was first transposed into Irish law by the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997). These Regulations were subsequently revoked and replaced by the European Communities (Birds and Natural Habitats) Regulations 2011, as amended (hereafter referred to as the *2011 Birds and Natural Habitats Regulations*). In addition, the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC) are transposed into Irish legislation through Part XAB of the Planning and Development Act 2000, as amended (the 2000 Act), and the 2011 Regulations. The legislative provisions governing Appropriate Assessment (AA) screening of planning applications are set out in Section 177U of the 2000 Act.

Articles 6(3) and 6(4) of the Habitats Directive establish the decision-making framework for plans and projects that may affect a Natura 2000 site. National guidance published by the Department of the Environment, Heritage and Local Government (DEHLG, 2009; revised 2010) promotes a four-stage process for AA and outlines the key tests at each stage (**Figure 1-3**).

- **Stage 1**: Screening for Appropriate Assessment
- **Stage 2**: Appropriate Assessment
- **Stage 3**: Assessment of alternative solutions (if required)
- **Stage 4**: Derogation under Article 6(4) (Imperative Reasons of Overriding Public Interest)

Stages 1 and 2 encompass the core requirements of Article 6(3). Stage 3 may form part of Article 6(3) or, where alternatives exist, act as a necessary precursor to Stage 4. Stage 4 represents the derogation process under Article 6(4).

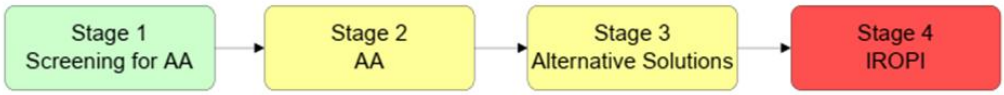

Figure 1-3: Four stages of the Appropriate Assessment Process.

An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

1.3. Guidance/Legislation

This report has been prepared in accordance with the following guidance:

- European Commission (2018) Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC Commission notice.
- Office of Planning Regulator (2021) Practice Note PN01 Appropriate Assessment screening for development management.
- Department of Environment, Housing and Local Government (2009) Appropriate Assessment of plans and projects in Ireland guidance for planning authorities (Revised 2010).
- European Commission (2001) Assessment of plans and projects in relation to Natura 2000 sites – methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC Commission notice.
- Habitats Directive (Council Directive 92/43/EEC) 1992.
- Birds Directive (Directive 79/409/EEC) 1979, amended Directive 2009/147/EC.
- European Communities (Birds and Natural Habitats) Regulations 2011-2021
- Department of Arts, Heritage and the Gaeltacht – National Parks and Wildlife Service (DAHG - NPWS) (2012) Marine Natura Impact Statements in Ireland Special Areas of Conservation, a working document.
- NPWS (2014) Guidance to Manage the Risk to Marine Mammals from Man-Made Sound Sources in Irish Waters.
- Maritime Area Planning Act (2021) – provisions relating to Appropriate Assessment (AA) and Environmental Impact Assessment (EIA) for maritime projects.
- MARA (2024) Applicant Technical Guidance (V7) for Maritime Area Consents and Licensing.

This assessment includes a desk-based review of available records of protected QIs and SCIs including the following sources:

- Conservation status assessment reports, backing documents and maps prepared to inform national reporting required under Article 17 of the Habitats Directive[1].
- Site synopsis, conservation objective reports and Natura 2000 forms available from NPWS.

- Published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual reports, species action plans and conservation management plans.
- Published summary data from the ObSERVE and NPWS coastal cetacean monitoring programmes, including west coast survey transects.
- Existing relevant mapping and databases *e.g.* waterbody status, species and habitat distribution, *etc*. (sourced from the Environmental Protection Agency (EPA) - http://gis.epa.ie/, the National Biodiversity Data Centre (NBDC) - http://maps.biodiversityireland.ie and the NPWS - http://www.npws.ie/mapsanddata/).

1.4. Statement of Authority

This report has been prepared by Brendan Dickerson (B.Sc., M.Sc., LL.M.), a senior consultant with AQUAFACT. Brendan holds a B.Sc. (Hons) in Marine Science from the University of Galway (UG), an M.Sc. in Marine Biology from University College Cork (UCC), and an LL.M. in Environmental Law from UCC. He has extensive knowledge of environmental law in both Ireland and the European Union, including the Habitats Directive and Ireland's National Marine Planning Framework (NMPF).

Brendan's work with AQUAFACT includes the preparation of Environmental Impact Assessment Reports (EIARs) and Natura Impact Statements (NIS), development of Offshore Renewable Energy (ORE) guidelines, and compilation of Dumping at Sea applications. He has also been involved in a broad range of marine survey work, including fisheries, intertidal and subtidal surveys, sample analyses, drop-down video interpretation, and associated reporting.

He is proficient in statistical analysis software such as SPSS, Minitab, and R, and in Geographic Information System (GIS) software including QGIS and ArcGIS for spatial data analysis and map production.

The report has been approved and edited by Aisling Hearty (BSc, MSc & ACIEEM).

Aisling is a Principal ecologist with over 6 years of experience in consultancy and marine ecology. She is a graduate of B.Sc Science from University of Galway (UG, formerly National University of Ireland, Galway) and a First-Class Honours M.Sc in Marine Biology from UCC (University College Cork) where she completed her thesis on habitat distribution modelling of odontocetes using bioacoustic analysis. She then went on to co-author a published paper on the findings of this thesis which supported the designation of the Southeastern Rockall Slope and Canyons as an Important Marine Mammal Area (IMMA). Aisling also has a wide range of experience in ecological survey techniques and methodologies including grab sampling, freshwater kick sampling, intertidal sampling and drop-down video deployment and analysis and she is GWO and BOSIET certified. Aisling has a JNCC certification and a NPWS certification as a Marine Mammal Observer and has carried out both desk and field-based assessments regarding Marine Mammals in Ireland. Aisling has a wide range of experience in the preparation of Appropriate Assessment Screening reports, Natura Impact Statements, Ecological Impact Assessments, Environmental Impact Assessment Reports and supporting documents for an IROPI designated project. Aisling's project history includes working on aquaculture licencing, renewable energy projects (solar farms and onshore and offshore wind) and water quality projects.

2. Stage 1: Screening for Appropriate Assessment

Stage I AA Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

i. whether a plan or project is directly connected to or necessary for the management of European site, and
ii. whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a European site in view of its conservation objectives.

If likely significant effects cannot be excluded on the basis of objective information – including cases where effects are significant, uncertain, or where the screening process becomes overly complex – the assessment must proceed to Stage 2 Appropriate Assessment (AA). Screening must be carried out without reliance on mitigation measures. Where potential impacts can clearly be avoided through modification or redesign of the plan or project, the screening process should be repeated on the revised proposal. The highest level of evidence and justification is required where a conclusion is reached at screening stage that no likely significant effects will occur.

2.1. Description of the Project

The Lahinch and Ennistymon Wastewater Treatment Plant (WWTP) Project will deliver a new treatment facility to replace outdated, overloaded plants currently serving both towns. The new WWTP is planned to accommodate approximately 9,300 population equivalent and will provide at least secondary treatment. This will address ongoing water quality issues resulting from existing discharges of untreated or inadequately treated effluent to the Inagh River, thereby supporting compliance with the Water Framework Directive and protecting both riverine and coastal environments.

A key element of the scheme is the development of a new marine outfall system, comprising a rising main and long sea outfall discharging treated effluent into Liscannor Bay. To minimise environmental impact, the outfall will be constructed using trenchless construction techniques where feasible.

A diffuser system will be installed at the outfall to enhance dispersion and reduce potential ecological effects. To inform environmental assessments and final design, a programme of site investigations is required, including bathymetric and geophysical surveys, intertidal and subtidal habitat surveys, sediment and water sampling, and where necessary, boreholes. A full description of the Proposed Maritime Usage is presented in **Attachment 3.1** which accompanies this MUL application.

The objective of these surveys is to gather robust baseline environmental and geotechnical data to support impact assessment, project design, and subsequent regulatory submissions, including Appropriate Assessment

(AA) and related risk assessments. All survey activities will adhere to best-practice standards and regulatory guidelines, with established protocols to minimise disturbance to sensitive habitats and species.

This report screens for likely significant effects arising solely from the survey phase of the WWTP project, as required for a Maritime Usage Licence (MUL). The site investigation programme is considered essential to designing and delivering wastewater infrastructure that meets current environmental and planning requirements.

The proposed MUL areas can be seen below in **Figure 2-1** and **Figure 2-2**.

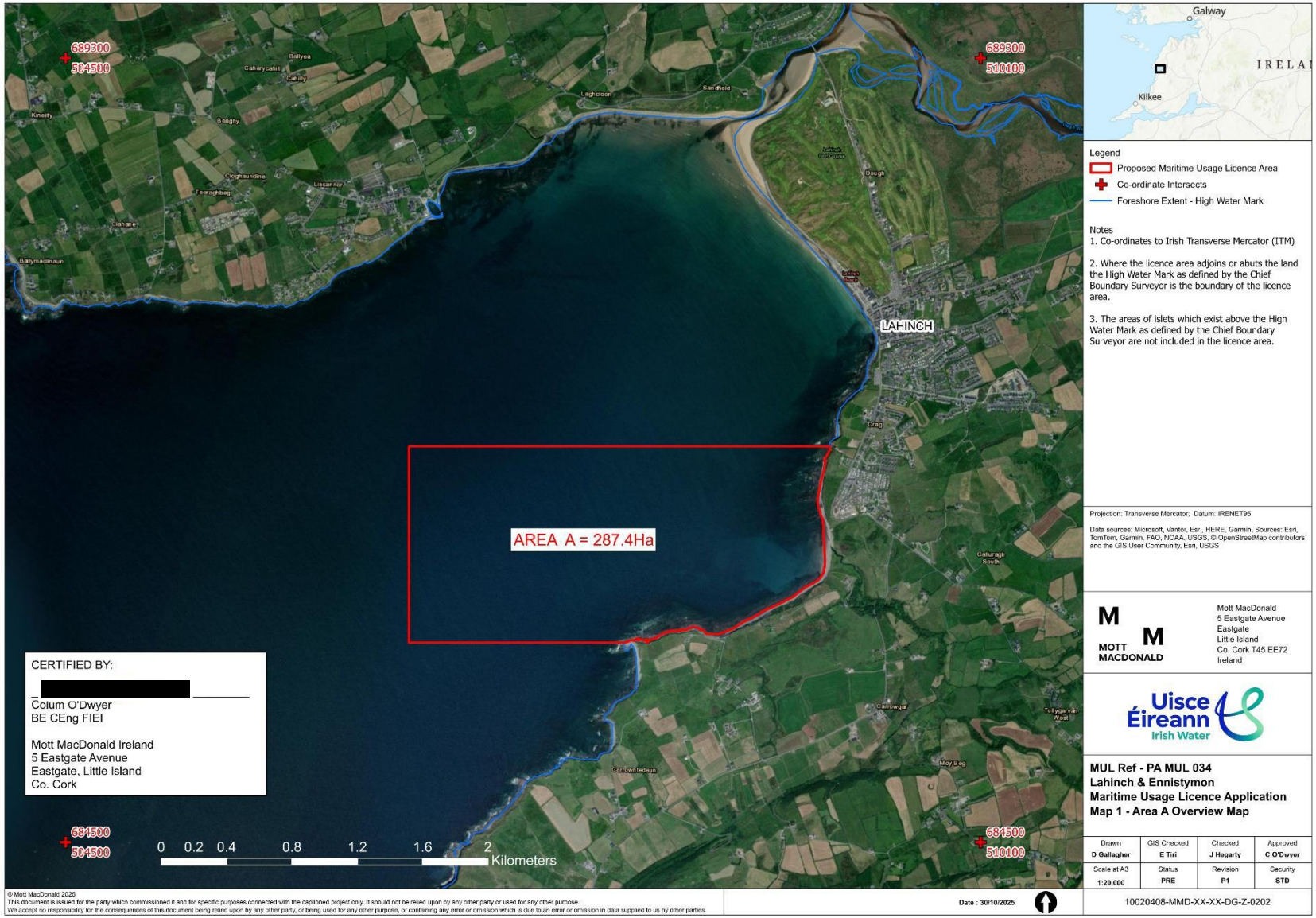

Figure 2-1: Proposed marine survey area (Area A) in Liscannor Bay, Co. Clare.

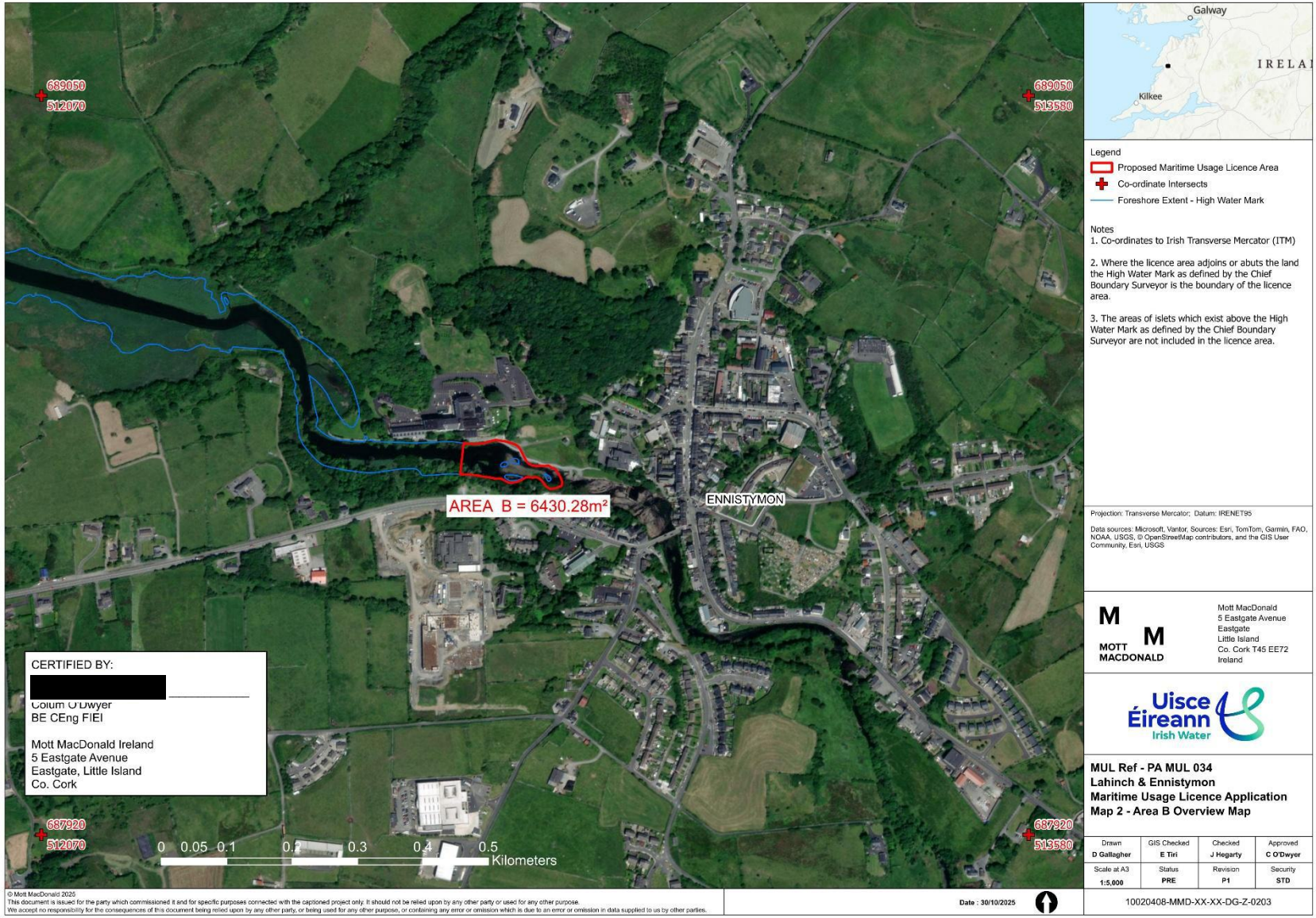

Figure 2-2: Proposed freshwater survey area (Area B) in Liscannor Bay, Co. Clare

2.2. Description of the Survey Activities

The proposed surveys will employ a suite of marine and intertidal investigation techniques designed to characterise the receiving environment within Liscannor Bay and at the proposed landfall location at Cregg Beach. These will provide essential baseline environmental and geotechnical information to support the design and assessment of the long sea outfall.

Bathymetric and Geophysical Surveys

A multibeam echosounder will be used to map seabed topography and features along the proposed pipeline corridor. Side-scan sonar will be deployed to provide high-resolution imagery of seabed conditions, habitats, and potential obstructions, while sub-bottom profiling (using a boomer or sparker system) will assess sediment stratigraphy and bedrock depth, critical for evaluating trenchless construction feasibility. A towed magnetometer survey will be undertaken to detect ferrous objects and unexploded ordnance (UXO) hazards along the route.

Geotechnical Site Investigations

Boreholes will be drilled at the entry point for the proposed trenchless construction at Cregg Beach, near the proposed trenchless construction exit point/diffuser location, and at regular intervals along the alignment (up to 20 in total). These will provide continuous core samples of superficial deposits and underlying bedrock. Cone Penetration Tests (CPTs) will be performed both offshore and in the intertidal area to determine in-situ soil strength and confirm HDD pullback feasibility. Vibrocores and grab samples (Van Veen or Day grab) will be collected to provide sediment classification, environmental chemistry, and faunal analysis. Intertidal trial pits and dynamic sampling/probing using a tracked mini rig will be undertaken at Cregg Beach to confirm shallow ground conditions and inform trenchless construction design.

Benthic and Water Quality Surveys

Benthic sampling will be carried out to establish baseline faunal communities and support biotope classification, ensuring potential effects of outfall installation on benthic ecology are fully assessed. Sediment and faunal samples will undergo laboratory analysis to identify invertebrate communities and any contamination. Water quality sampling will also be undertaken at selected points within Liscannor Bay to establish baseline conditions for future comparison during and after construction.

Freshwater Investigations

At Area B, located upstream of the Falls Hotel in Ennistymon, kick sampling and water quality sampling will be carried out within the Inagh River. These surveys will characterise freshwater ecological conditions and establish a baseline for assessing potential improvements once existing untreated discharges are decommissioned.

Survey Logistics

Marine survey vessels will mobilise from Liscannor Pier, providing direct access to the outfall corridor. Intertidal surveys at Cregg Beach will be scheduled around tidal cycles to ensure safety and minimise disturbance to the public and sensitive habitats. The site investigation surveys are provisionally scheduled to take place from Q4 2026 to Q1 2027. However, to account for contingency in sourcing appropriate contractors to carry out all SI activities, potential weather down-time, unforeseen issues with scheduling or sequencing, a total duration of 24 months is being sought for this MUL. A list of survey types, coverage, equipment and operation schedule can be seen in **Table 2-1** and **Table 2-2**.

The results of these surveys will provide essential baseline data to inform the Appropriate Assessment process under the Habitats Directive and ensure that potential effects on designated sites and qualifying interests are fully assessed.

Table 2-1: Geotechnical survey methodology.

Investigation Type	Location Focus	Max Quantity / Spacing	Worst-Case Equipment & Justification	Vessel Operations (Length, Width, Duration)
Boreholes	1 at landfall (Trenchless construction entry), 1 near Trenchless construction exit/diffuser, others positioned at 100m centres	Up to 20 total (including for contingency for repositioning / redrills to overcome obstructions)	Jack-up barge with soil and rotary drilling rig equipment (e.g., Dando 2000 / Commachio 3000 / GeoborS Drilling rig). Needed to confirm stratigraphy and Trenchless construction feasibility; barge ensures safe access offshore.	Length: 20–30m, Width: 10–15m; 24hrs – 36hrs per borehole (24hr working conditions assumed)
CPTs (Overwater and Intertidal)	At landfall, at 200m centres along route, and diffuser zone	Up to 10 total	CPT rig on jack-up barge or floating platform (e.g., ROSON). Provides in-situ soil strength for Trenchless construction pullback and trench stability.	Length: 15–25m, Width: 8–10m; 0.5 - 1 day per CPT
Vibrocores	Distributed along route, with focus on diffuser zone and sediment variability	Up to 15 total	OSIL Vibrocorer deployed from floating vessel. continous sediment sampling for classification and environmental assessment.	Length: 10–15m, Width: 3–4m; 0.5 - 1 day per vibrocore

Investigation Type	Location Focus	Max Quantity / Spacing	Worst-Case Equipment & Justification	Vessel Operations (Length, Width, Duration)
Seabed Sediment Sampling	Nearshore, mid-route, and diffuser zone	Up to 20 total	Van Veen or Day grab sampler from vessel. Environmental and chemical analysis; supports MARA's ecological impact review.	Length: 10–15m, Width: 3–4m; 3 – 4 days to complete seabed sampling campaign
Trial Pits (Intertidal)	Cregg beach landfall area, spaced across beach width	Up to 4 total	Mini-excavator or hand-dug pits. Confirms constructability of Trenchless construction entry pit or trench; low-impact equipment for sensitive zone.	Land-based mini-excavator; 1 day per pit
Dynamic Sampling and Probing (Intertidal)	Cregg beach landfall area, spaced across beach width	Up to 4 total	Tracked mini rig (Terrier or similar) to characterize ground conditions with *in situ* testing	Mini boring rig with probing attachment 0.5 day per position

Table 2-2: Geophysical survey methodology.

Survey Type	Coverage / Location Focus	Max Quantity / Spacing	Worst-Case Equipment & Justification	Vessel Operations (Length, Width, Duration)
Sub-bottom profiling	Corridor extending 50–100m either side of the indicative pipeline route, including diffuser zone and Trenchless construction exit area	25–50 m line spacing	Towed boomer/sparker system from survey vessel. Required to map sediment layers and bedrock depth for Trenchless construction feasibility and diffuser siting.	Length: 10–15m, Width: 3–4m; 3 - 5 days duration
Magnetometer	Corridor extending 50–100m either side of the indicative pipeline route and diffuser zone (UXO check, seabed obstructions)	25 m line spacing	Marine magnetometer (e.g., Geometrics G-882). Detects ferrous objects that may interfere with trenching or diffuser installation.	Length: 10–15m, Width: 3–4m; 3 - 5 days duration
Side Scan Sonar	Corridor extending 50–100m either side of the indicative pipeline route and diffuser zone, especially nearshore and outlet areas	Dual-frequency, full coverage	Edgetech 4200 or Klein 3000 side scan sonar. Maps seabed features, habitats, and potential obstructions for routing and diffuser design.	Length: 10–15m, Width: 3–4m; 3 - 5 days duration

2.3. Assessment Methodology: Source-Pathway-Receptor

The assessment of impact mechanisms considers all relevant aspects of the Project that have potential direct or indirect and effects on conservation features. In order to establish the Zone of Influence (ZoI) of the Project, the assessment of likely significant effects will be based on the Source-Pathway-Receptor (S-P-R) Model (OPR, 2021):

- **Source** - Identification of the characteristics of the Project based on the nature, size, location and type of impacts.
- **Pathway** – Identification of pathways that could link European sites and their conservation features to the Project.
- **Receptor** – Identification of the location, nature and sensitivities of the conservation features and the ecological conditions supporting their survival and the conservation objectives specified to maintain or restore favourable conservation status.

To establish the Zone of Influence (ZoI) of the project, the assessment of connectivity between impact mechanisms (sources) and conservation features (i.e. the QIs of SACs and SCIs of SPAs) considers the location of the project relative to designated habitats and non-mobile species, species' foraging ranges and migration routes, proximity to foraging and breeding areas, potential behavioural responses to disturbance, hydrological connectivity with conservation features, and indirect effects on prey species that could alter ecological interactions.

To inform the screening exercise, available data on protected habitats and species were mapped and interrogated in a Geographic Information System (GIS) to identify potential Source–Pathway–Receptor (S–P–R) connections. Sources (impact mechanisms), pathways (hydrological, physical or ecological connectivity), and receptors (conservation features) were identified with reference to ecological surveys undertaken in the area. Where no ecological pathway or functional link exists between the project and the conservation features of a European site, there is no potential for likely significant effects, and those features can be screened out.

Section 2.6 considers the likely significant effects from the impact mechanisms from the Project alone, while **section 2.7** considers potential in-combination effects with other plans or projects.

2.4. Potential Impact Mechanisms

A detailed description of the project is provided above (see **section 2.1**). Based on the characteristics of the proposed survey operations, and in line with the requirements of Article 6(3) of the Habitats Directive, this section identifies and evaluates potential impact mechanisms that could give rise to effects on nearby European sites. These mechanisms are assessed using a Source–Pathway–Receptor (S-P-R) framework, considering both the spatial extent of potential effects (the Zone of Influence) and the sensitivity of the relevant Qualifying Interests and Special Conservation Interests. The following are the potential sources of impact considered in this assessment.

2.4.1. Potential Impact Mechanism 1: Pollution of marine environment from spills/leakages

The proposed survey involves a single vessel undertaking short-term, low-intensity operations in open coastal waters. Only very small volumes of fuel and oils are held onboard, and no discharges of contaminants to the marine environment are required as part of normal survey activity.

A minor accidental spill (*e.g*. a small diesel release during refuelling or vessel operation) is considered possible but would be highly localised and rapidly dispersed or evaporated in the high-energy coastal waters of Liscannor Bay. Such an event would not result in any deterioration of water quality at a scale relevant to the Conservation Objectives of any European site.

There is no realistic source–pathway–receptor linkage between the small-scale survey activities and sensitive qualifying interests, including marine mammals, fish, seabirds, intertidal habitats or subtidal habitats within SACs. Any potential hydrocarbon sheen would remain close to the vessel and would disperse within a very short period, with no potential for population-level or habitat-level effects.

On this basis, the risk of pollution giving rise to a likely significant effect on any European site is considered negligible and this impact pathway can be screened out at Stage 1.

Standard vessel operational procedures (e.g., MARPOL compliance, onboard spill kits) will be implemented.

2.4.2. Potential Impact Mechanism 2: Noise and vibration

The site investigation surveys from the vessel have the potential to cause increased underwater noise within the immediate vicinity of the vessel. The underwater noise could potentially affect marine mammals which are sensitive to noise, including Annex II species such as the bottlenose dolphin, harbour porpoise, grey seal, and harbour seal.

If the frequency of anthropogenic noise overlaps with the frequencies used by marine mammals, this may reduce the animal's ability to detect important sounds for navigation, communication, and prey detection (Weilgart, 2007). This is termed acoustic masking, which may occur anywhere within an organism's auditory

range (Wright *et al.,* 2007; Richardson *et al.,* 1995). Masking of important vocalisations will result in increasing information ambiguity and, in extreme circumstances, may result in cetaceans being unable to orientate themselves or hunt/evade predation in the marine environment (Wright *et al.* 2007). Southall *et al*. (2008) categorised seals and cetaceans into five functional groups based on several laboratory studies, audiometric data and through comparisons of anatomy. The functional groups categorise cetaceans in relation to their known auditory ability and functional frequencies, whilst all pinniped species were assessed based on their auditory ability in air as well as their auditory ability in water. In air, hearing ranges for Eurasian otters are thought to be between 0.2 and 32 kHz (Voigt *et al*., 2019), however underwater comparisons were not available at the time of writing this report. Details of the hearing ranges of cetaceans and pinnipeds are included below as described by Southall *et al.* (2019):

- Low frequency cetaceans (*e.g.,* minke whale): 0.007 – 35 kHz
- High frequency cetaceans (*e.g.,* bottlenose dolphin): 0.15 – 160 kHz
- Very high frequency cetaceans (*e.g.,* harbour porpoise): 0.2 – 180 kHz
- Phocid carnivores in water (*e.g.,* harbour seal, grey seal): 0.05 – 86 kHz

Smith *et al*. (2024) studied noise levels generated from a rigid inflatable boat (RIB) and found that noise levels fall within the low-frequency range (below 1 kHz (National Institutes of Health)), and that noise levels at the source remained relatively constant across measured speed.

2.4.3. Potential Impact Mechanism 3: Physical disturbance

Survey methods will include boreholes, CPTs, vibrocores, sediment grabs, and intertidal trial pits (**Table 2-1** and **Table 2-2**). Each technique will disturb a very small footprint relative to the available habitat in Liscannor Bay. For example, grab samplers (Van Veen or Day grabs) typically disturb less than 0.1 m² per sample, and vibrocores recover a narrow sediment core with minimal seabed disruption. Boreholes (up to 20 in total, spaced along the outfall corridor) will be drilled using a jack-up barge to obtain continuous cores of superficial and bedrock strata; while each borehole represents a more intensive activity, the total area of impact remains very limited. CPTs and intertidal dynamic probing similarly involve point-source disturbance, with small physical footprints.

The duration of disturbance at each station is short (typically <1 day per borehole, half a day per vibrocore or CPT, and only minutes for grab samples). This ensures that impacts are temporary, with benthic habitats expected to recover rapidly following completion of surveys. As the surveys are temporary in nature, indirect impacts such as prolonged smothering or persistent turbidity plumes are not anticipated. Importantly, the subtidal survey areas do not overlap directly with any designated SACs or SPAs, and the spatial scale of direct disturbance is relatively minor in the context of the wider bay and adjacent protected sites.

The operation of survey vessels (10–20 m in length for geophysical and sampling activities, and larger jack-up barges for boreholes) has the potential to cause temporary disturbance to marine fauna. Increased vessel traffic in and around Liscannor Bay may lead to localised displacement of sensitive species such as harbour porpoise, common dolphin, grey and harbour seals, and foraging seabirds from important feeding areas. Vessel movements also increase the risk of collision with larger marine fauna, including basking shark, seals, and cetaceans, although given the relatively small number of survey vessels and slow operating speeds, the risk is considered low.

For species reliant on undisturbed intertidal or nearshore habitats, such as otter, increased vessel presence and associated noise may cause temporary avoidance behaviour, potentially reducing habitat use during survey operations. These effects are expected to be temporary and reversible, ceasing once vessel activity concludes.

2.5. European sites in the Zone of Influence (ZoI)

The The Zone of Influence (ZoI) for the proposed surveys has been defined as the maximum spatial extent over which the Project could plausibly give rise to direct or indirect effects on European sites, taking account of the nature of the activities, the relevant impact pathways, and the ecological characteristics of potential receptors. These factors informed a precautionary delineation of the ZoI, ensuring that all relevant Natura 2000 sites and receptors with a reasonable likelihood of interaction were included in the screening and subsequent impact assessment.

The ZoI is not defined by a single distance buffer. Instead, it has been established using a source–pathway–receptor approach, informed by:

– the potential spatial extent of underwater noise and vessel disturbance;

– the potential for localised sediment disturbance and dispersion; and

– species-specific ecology, including mobility, habitat use, and dependence on fixed locations (e.g. breeding sites or haul-out areas).

Table 2-3 and **Table 2-4** below show the conservation features for which the European sites are designated, their conservation objectives and the distance of the SACs and SPAs to the Project. Bird species identified as 'notable species' in the site synopsis reports for each SPA are included. All site synopsis and conservation objectives for the European sites can be accessed through the NPWS website[2].

A map of all SACs and SPAs within the ZoI of the project can be seen below in (**Figure 2-3**).

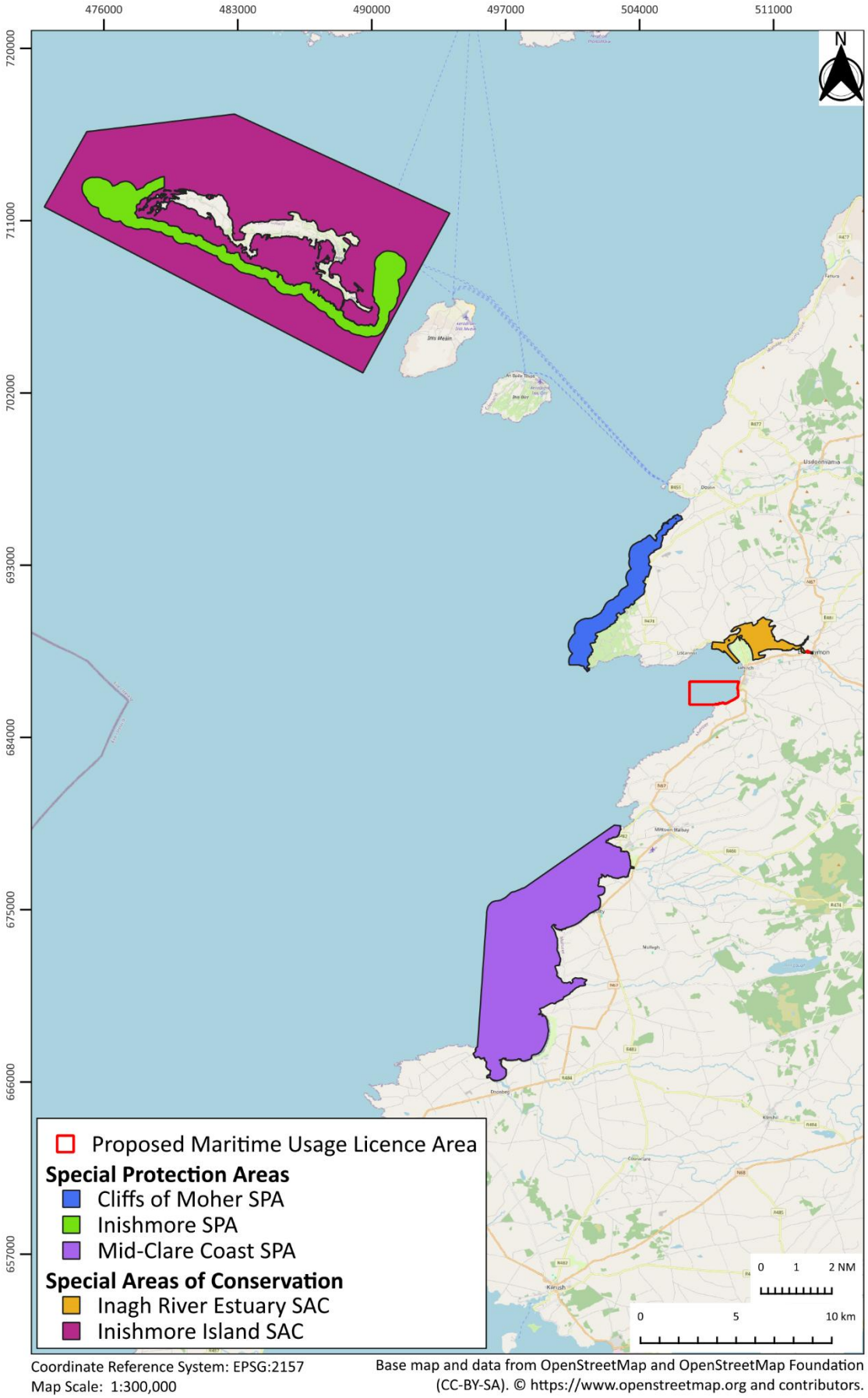

Figure 2-3: SACs and SPAs within the ZoI of the project in Liscannor Bay, Co. Clare (excluding SACs for highly mobile Annex II species).

2.5.1. Special Areas of Conservation (SAC)

In accordance with Article 6(3) of the Habitats Directive, this assessment considers whether the proposed survey operations—including boreholes, CPTs, vibrocores, sediment sampling, and associated vessel activities—could lead to likely significant effects on Special Areas of Conservation (SACs) within the project's defined Zone of Influence (ZoI). The ZoI encompasses the spatial extent where direct, indirect, or in-combination impacts from the surveys may reasonably occur, including effects related to sediment disturbance, water quality alteration, underwater noise, and habitat modification. All SACs with confirmed or potential hydrological or ecological connectivity to these survey areas have been screened in for detailed assessment.

The Qualifying Interests (QIs) and site-specific conservation objectives of each relevant SAC have been reviewed to determine whether the proposed activities could undermine the conservation objectives of these sites, either alone or in-combination with other plans or projects.

The nearest SAC within the Zone of Influence of the proposed surveys is the Inagh River Estuary SAC [000036]

QIs:

- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*

* [2130] Grey dunes are listed as a **priority habitat** under the Habitats Directive.

A full list of relevant SACs and their QIs can be found in (**Table 2-3**).

Table 2-3: Qualifying Interests (QIs) for SACs in the Zone of Influence (ZoI) of the proposed project.

SAC (site code)	Distance from Project (km)	Qualifying Interest	Ecological Group	Conservation objectives
Inagh River Estuary SAC [000036]	<1km from area A 0 km from area B	Salicornia and other annuals colonising mud and sand [1310]	Annex I saltmarsh habitat	Restore favourable conservation status
		Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]	Annex I saltmarsh habitat	Restore favourable conservation status
		Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	Annex I saltmarsh habitat	Restore favourable conservation status
		Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]	Annex I coastal habitat	Restore favourable conservation status
		Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Annex I coastal habitat	Restore favourable conservation status
Inishmore Island SAC [000213]	25 km from area A 26.7 km from area B	Coastal lagoons [1150]	Annex I coastal habitat	Restore favourable conservation status
		Reefs [1170]	Annex I coastal habitat	Maintain favourable conservation status
		Perennial vegetation of stony banks [1220]	Annex I coastal habitat	Maintain favourable conservation status
		Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	Annex I coastal habitat	Maintain favourable conservation status
		Embryonic shifting dunes [2110]	Annex I coastal habitat	Maintain favourable conservation status
		Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]	Annex I coastal habitat	Maintain favourable conservation status
		Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Annex I coastal habitat	Restore favourable conservation status
		Dunes with Salix repens ssp. argentea (*Salicion arenariae*) [2170]	Annex I coastal habitat	Maintain favourable conservation status
		Humid dune slacks [2190]	Annex I coastal habitat	Maintain favourable conservation status
		Machairs (* in Ireland) [21A0]	Annex I priority coastal habitat	Restore favourable conservation status
		European dry heaths [4030]	Annex I terrestrial habitat	Maintain favourable conservation status
		Alpine and Boreal heaths [4060]	Annex I Heath and Scrub Habitat	Under review
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]	Annex I grassland habitat	Maintain favourable conservation status

SAC (site code)	Distance from Project (km)	Qualifying Interest	Ecological Group	Conservation objectives
		Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510]	Annex I terrestrial habitat	Maintain favourable conservation status
		Limestone pavements [8240]	Annex I terrestrial habitat	Maintain favourable conservation status
		Submerged or partially submerged sea caves [8330]	Annex I coastal habitat	Maintain favourable conservation status
		Vertigo angustior (Narrow-mouthed Whorl Snail) [1014]	Annex II terrestrial invertebrate	Maintain favourable conservation status
		Phocoena phocoena (Harbour Porpoise) [1351]	Annex II marine mammal	Maintain favourable conservation status

2.5.2. Special Protection Areas (SPA)

In accordance with Article 6(3) of the Habitats Directive, this assessment evaluates the potential for the proposed survey activities to result in significant effects on any Special Protection Areas (SPAs) located within the identified zone of influence of the project. This zone encompasses the area within which direct, indirect, or cumulative impacts could plausibly arise, including those associated with disturbance to bird species, changes in water quality, sediment dispersion, and alteration of foraging or roosting habitats. All SPAs that are ecologically connected to the project site, either through hydrological linkage or functional habitat use by listed bird species, have been included in the screening process. The Special Conservation Interests (SCIs) and site-specific conservation objectives of each SPA have been examined to determine whether the proposed surveys could adversely affect the integrity of these sites, either individually or in combination with other relevant plans or projects.

The nearest SPA within the Zone of Influence (ZoI) of the proposed surveys is the Cliffs of Moher SPA [004005]. The SCIs for all SPAs within the ZoI can be seen in **Table 2-4** which also contains their site-specific conservation objectives. The foraging ranges for identified SCIs can be found below in **Table 2-5**.

SCIs:

- Fulmar (*Fulmarus glacialis*) [A009]
- Kittiwake (*Rissa tridactyla*) [A188]
- Guillemot (*Uria aalge*) [A199]
- Razorbill (*Alca torda*) [A200]
- Puffin (*Fratercula arctica*) [A204]
- Chough (*Pyrrhocorax pyrrhocorax*) [A346]

Table 2-4: SPAs and their SCIs within the Zone of Influence (ZoI) of the proposed project.

SPA (site code)	Distance from Project (km)	Qualifying Interest	Ecological Group	Conservation objectives
Cliffs of Moher SPA [004005]	6.3km from area A 8.3 km from area B	Fulmar (*Fulmaris glacialis)* [A009]	Annex I seabird species	Maintain favourable conservation condition
		Kittiwake (*Rissa tridactyla*) [A188]	Annex I seabird species	Restore favourable conservation condition
		Guillemot (*Uria aalge*) [A199]	Annex I seabird species	Restore favourable conservation condition
		Razorbill (*Alca torda*) [A200]	Annex I seabird species	Restore favourable conservation condition
		Puffin (*Fratercula arctica*) [A204]	Annex I seabird species	Maintain favourable conservation condition
		Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Annex I bird species	Restore favourable conservation condition
Mid-Clare Coast SPA [004182]	8.9 km from area A 12.9 km from area B	Cormorant (*Phalacrocorax carbo*) [A017]	Annex I seabird species	Maintain favourable conservation condition
		Barnacle Goose (*Branta leucopsis*) [A045]	Annex I waterbird species	Maintain favourable conservation condition
		Ringed Plover (*Charadrius hiaticula*) [A137]	Annex I bird species	Maintain favourable conservation condition
		Sanderling (*Calidris alba*) [A144]	Annex I bird species	Maintain favourable conservation condition
		Purple Sandpiper (*Calidris maritima*) [A148]	Annex I bird species	Maintain favourable conservation condition
		Dunlin (*Calidris alpina*) [A149]	Annex I bird species	Maintain favourable conservation condition
		Turnstone (*Arenaria interpres*) [A169]	Annex I bird species	Maintain favourable conservation condition
		Wetland and Waterbirds [A999]	Annex I bird species	Maintain favourable conservation condition
Inishmore SPA [004152]	25.8 km from area A 26.9 km from area B	Kittiwake (*Rissa tridactyla*) [A188]	Annex I seabird species	Restore favourable conservation condition
		Arctic Tern (*Sterna paradisaea*) [A194]	Annex I bird species	Restore favourable conservation condition
		Guillemot (*Uria aalge*) [A199]	Annex I seabird species	Restore favourable conservation condition
		Little Tern (*Sternula albifrons*) [A885]	Annex I bird species	Restore favourable conservation condition

Table 2-5: Foraging distances of relevant SCIs.

Species (SCI code)	Typical foraging/commuting distance used for screening	Notes	Key sources
Fulmar (*Fulmaris glacialis)* [A009]	Mean range of 69 Km, max of 664 km	Offshore forager; large colony-centred ranges	Natural England Technical Information Note TIN126[3]
Kittiwake (*Rissa tridactyla*) [A188]	Commonly 30-50 km, Mean max ~60 km (breeding)	Pelagic forager; wide colony radius	Natural England Technical Information Note TIN128[4]
Guillemot (*Uria aalge*) [A199	Commonly 24 km, Mean max ~50–100 km (breeding)	Central-place forager at sea; large ranges	Natural England Technical Information Note TIN123[5]
Razorbill (*Alca torda*) [A200]	Mean foraging range of 10 km, with a maximum distance of 51 km recorded	Disperse offshore colonies from July - August	Natural England Technical Information Note TIN124[6]
Puffin (*Fratercula arctica*) [A204]	The foraging range varies between colonies and with the season. The mean foraging range is 30 km, with a maximum recorded foraging distance of 200 km	Over winter individuals live in the open sea	Natural England Technical Information Note TIN125[7]
Chough (*Pyrrhocorax pyrrhocorax*) [A346]	Typically 0–2 km from nest/roost (often ≤1–1.5 km)	Coastal pasture/strandline specialist; short commute	Robertson *et al*., 1995 & Colhoun *et al*., 2024
Cormorant (*Phalacrocorax carbo*) [A017]	Mean range of 25 km, max of 35 km	Pursuit-divers which disturb prey from sandy or muddy habitats	Natural England Technical Information Note TIN140[8]
Barnacle Goose (*Branta leucopsis*) [A045]	Commonly 10–15 km; occasionally longer	Primarily forage on terrestrial grasslands; limited use of intertidal.	Clausen & Bregnballe 2022, Goodship & Furness 2022
Ringed Plover (*Charadrius hiaticula*) [A137]	Typically within estuary/shoreline; ~1–5 km from roosts	Small coastal home ranges; strong roost–flat linkage.	Clausen & Bregnballe 2022, Goodship & Furness 2022
Sanderling (*Calidris alba*) [A144]	Wintering bird, between September and April. Coastline forager.	Intertidal forager, rushing along the tidal edge	Birdwatch Ireland

Purple Sandpiper (*Calidris maritima*) [A148]	Typically ≤5–10 km	Does not forage during rising tides, restricted foraging period during daylight high tides	Clausen & Bregnballe 2022, Goodship & Furness 2022
Dunlin (*Calidris alpina*) [A149]	Majority ≤5 km from roost	Densities fall steeply beyond ~5 km from roost.	Dias *et al*., 2006
Turnstone (*Arenaria interpres*) [A169]	~1 km typical foraging range	Wader. Winter visitor, does not breed in Ireland.	Fuller, 2003
Arctic Tern (*Sterna paradisaea*) [A194]	Mean foraging range of 24.2 km, maximum foraging distance of 30 km	Plunge-diving or surface-dipping, foraging in small, tight groups.	Natural England Technical Information Note TIN137[9]
Little Tern (*Sternula albifrons*) [A885]	Most foraging within 1 km of the coast. Mean foraging range of 6.3 km, maximum foraging distance of 11 km	Plunge-dive following period of hovering, Feeding single, in small parties or in widely scattered flocks	Natural England Technical Information Note TIN139[10]

2.6. Assessment of Likely Significant Effects

This screening exercise considers the potential for the proposed surveys to result in significant in situ or ex situ effects on European sites, that is, effects on Conservation Features occurring within or functionally connected to the sites. Where it is not possible, based on objective information, to exclude the likelihood of significant effects arising from the proposed surveys, either alone or in combination with other plans or projects, a Stage 2 Appropriate Assessment (Natura Impact Statement) is required.

A detailed description of the proposed Project has been provided in the preceding sections. Based on the nature, scale, and location of the proposed surveys, specifically taking sediment grabs from a survey vessel, boreholes, CPTs, vibrocores, seabed sediment sampling, trial pits dynamic sapling and probing, sub bottom profiling, a magnetometer, and side scan sonar, there are several potential impact mechanisms that could give rise to effects on nearby European sites. These impact mechanisms (or sources of impact) arise primarily from the physical and operational characteristics of and include both direct and indirect pressures on the receiving environment. The key potential impact mechanisms identified for assessment are as follows:

Potential Impact Mechanism 1: Pollution of marine environment from spills/leakages

Potential Impact Mechanism 2: Noise and vibration

Potential Impact Mechanism 3: Physical disturbance

Table 2-6: Assessment of potential significant effects from the impact mechanisms to the conservation features.

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
Inagh River Estuary SAC [000036]	Salicornia and other annuals colonising mud and sand [1310]	**Impact Mechanism 1: Accidental Fuel Spills/Leakages** **Impact Mechanism 3: Physical Disturbance**	There is no direct spatial overlap or hydrodynamic connectivity between the location of marine and freshwater survey activities and the mapped extents of habitat within the Inagh River Estuary SAC. Surveys are restricted to offshore, subtidal, and upstream freshwater areas, while Salicornia habitats are restricted to specific intertidal estuarine locations outside the footprint and immediate zone of influence of the s.	N - No credible pathway, screened out at Stage 1
	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]		There is no direct spatial overlap or hydrodynamic connectivity between the locations of the proposed marine and freshwater surveys and the mapped extents of Atlantic salt meadows in the Inagh River Estuary SAC. Survey activities are confined to offshore/subtidal and discrete upstream freshwater locations, while Atlantic salt meadows occur in upper estuarine zones isolated from the footprint and realistic influence of activities. With robust best-practice measures (spill response, maintenance), the risk of contaminants reaching these habitats is very low, and no credible pathway exists for significant adverse effect.	N - No credible pathway, screened out at Stage 1
	Mediterranean salt meadows (*Juncetalia maritimi*) [1410]		As with Atlantic salt meadows, there is no direct overlap or credible hydrological or physical connectivity between the location of proposed surveys and the Mediterranean salt meadow habitats. These communities are spatially restricted to estuarine settings outside the footprint and immediate influence of the survey activities. Best practice measures and spill prevention protocols further reduce residual risk below significance thresholds, so no realistic impact pathway exists.	N - No credible pathway, screened out at Stage 1
	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]		The shifting dune habitat occurs above the high-water mark, well outside the footprint of marine and freshwater surveys. There is no hydrological or physical connectivity between survey locations and these terrestrial habitats. Furthermore, the white dunes are spatially separated from potential spill or disturbance pathways associated with the proposed urveys. No credible pathway exists for significant adverse effect, due to magnitude, distance and lack of connection.	N - No credible pathway, screened out at Stage 1
	Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]		The shifting dune habitat occurs above the high-water mark, well outside the footprint of marine and freshwater surveys. There is no hydrological or physical connectivity between survey locations and these terrestrial habitats. No credible pathway exists for significant adverse effect due to magnitude distance and lack of connection.	N - No credible pathway, screened out at Stage 1
Inishmore Island SAC [000213]	Coastal lagoons [1150]	**Impact Mechanism 1: Accidental Fuel Spills/Leakages**	Coastal lagoon features are distant from survey activities, with no hydrological or physical connection; survey activities are temporary and low-intensity, so impacts are not possible.	N - No credible pathway, screened out at Stage 1

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
	Reefs [1170]	**Impact Mechanism 3: Physical Disturbance**	Reef habitat occurs distant from surveys, outside area of influence; no potential for direct or indirect impact pathways.	N - No credible pathway, screened out at Stage 1
	Perennial vegetation of stony banks [1220]		Stony bank vegetation is above high-water mark and spatially removed from survey zone.	N - No credible pathway, screened out at Stage 1
	Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]		Sea cliff features are terrestrial and geographically isolated from the survey location.	N - No credible pathway, screened out at Stage 1
	Embryonic shifting dunes [2110]		No credible pathway: dune features occur above the high-water mark and will not be influenced by proposed activities	N - No credible pathway, screened out at Stage 1
	Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]		No credible pathway: dune features occur above the high-water mark and will not be influenced by proposed activities	N - No credible pathway, screened out at Stage 1
	Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]		No credible pathway: dune features occur above the high-water mark and will not be influenced by proposed activities	N - No credible pathway, screened out at Stage 1
	Dunes with Salix repens ssp. argentea (Salicion arenariae) [2170]		No credible pathway: dune features occur above the high-water mark and will not be influenced by proposed activities	N - No credible pathway, screened out at Stage 1
	Humid dune slacks [2190]		Humid dune slack features are above the high-water mark so will not be influenced by proposed activities.	N - No credible pathway,

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
				screened out at Stage 1
	Machairs (* in Ireland) [21A0]		Machair habitats are located above the intertidal zone and are fully isolated from the survey activities.	N - No credible pathway, screened out at Stage 1
	European dry heaths [4030]		Dry heath features are upland/terrestrial and remote from proposed activities.	N - No credible pathway, screened out at Stage 1
	Alpine and Boreal heaths [4060]		Alpine/boreal heath features are upland/terrestrial and outside the project area.	N - No credible pathway, screened out at Stage 1
	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]		Calcareous grassland habitats are terrestrial and not hydrologically linked to the survey area.	N - No credible pathway, screened out at Stage 1
	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) [6510]		Hay meadow is terrestrial and hydrologically disconnected from survey area.	N - No credible pathway, screened out at Stage 1
	Limestone pavements [8240]		Limestone pavement features are terrestrial and not present within or adjacent to the survey footprint.	N - No credible pathway,

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
				screened out at Stage 1
	Submerged or partially submerged sea caves [8330]		Sea caves designated in this SAC are distant from proposed surveys; no hydrological or sediment transport connection exists.	N - No credible pathway, screened out at Stage 1
	Vertigo angustior (Narrow-mouthed Whorl Snail) [1014]		Suitable habitats for this terrestrial snail are not present within or adjacent to the survey area.	N - No credible pathway, screened out at Stage 1
	Harbour Porpoise (*Phocoena phocoena*) [1351]	**Impact Mechanism 1: Accidental Fuel Spills/Leakages** **Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	The locality of the surveys relative to the SAC and known porpoise ranges supports this limited risk. Potential pollution effects are screened out at this stage, as any accidental releases would be extremely small, highly localised, and rapidly dispersed in the high-energy coastal waters, providing no credible source–pathway–receptor linkage. Survey operations may produce low-intensity noise potentially causing temporary avoidance or behavioural changes in harbour porpoise and as a result this impact will be brought to Stage 2 for assessment. Physical disturbance due to vessel and equipment presence and operation may also cause avoidance or behavioural changes, however, the intensity and duration of these activities are limited and are unlikely to result in injury, long-term displacement, or population-level effects, this impact will be brought to Stage 2 on a precautionary basis to assess further.	Y - Connectivity established, will be brought forward for Stage 2 assessment

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
Kilkieran Bay and Islands SAC [002111]	Harbour Porpoise (*Phocoena phocoena*) [1351]	**Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	Survey operations may produce low-intensity noise potentially causing temporary avoidance or behavioural changes in harbour porpoise and as a result this impact will be brought to Stage 2 for assessment. Physical disturbance due to vessel and equipment presence and operation may also cause avoidance or behavioural changes, however, the intensity and duration of these activities are limited and are unlikely to result in injury, long-term displacement, or population-level effects, this impact will be brought to Stage 2 on a precautionary basis to assess further.	Y - Connectivity established, will be brought forward for Stage 2 assessment
West Connacht Coast SAC [002998]	Harbour Porpoise (*Phocoena phocoena*) [1351] Bottlenose dolphin (*Tursiops truncatus*) [1349]	**Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	Survey operations may produce low-intensity noise potentially causing temporary avoidance or behavioural changes in harbour porpoise and bottlenose dolphin and as a result this impact will be brought to Stage 2 for assessment. Physical disturbance due to vessel and equipment presence and operation may also cause avoidance or behavioural changes, however, the intensity and duration of these activities are limited and are unlikely to result in injury, long-term displacement, or population-level effects, this impact will be brought to Stage 2 on a precautionary basis to assess further	Y - Connectivity established, will be brought forward for Stage 2 assessment
Slyne Head Peninsula SAC [002074]	Bottlenose dolphin (*Tursiops truncatus*) [1349]	**Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	Survey operations may produce low-intensity noise potentially causing temporary avoidance or behavioural changes in bottlenose dolphin and as a result this impact will be brought to Stage 2 for assessment. Physical disturbance due to vessel and equipment presence and operation may also cause avoidance or behavioural changes, however, the intensity and duration of these activities are limited and are unlikely to result in injury, long-term displacement, or population-level effects, this impact will be brought to Stage 2 on a precautionary basis to assess further	Y - Connectivity established, will be brought forward for Stage 2 assessment

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
Slyne Head Islands SAC [000328]	Bottlenose dolphin (*Tursiops truncatus*) [1349]	**Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	Survey operations may produce low-intensity noise potentially causing temporary avoidance or behavioural changes in bottlenose dolphin and as a result this impact will be brought to Stage 2 for assessment. Physical disturbance due to vessel and equipment presence and operation may also cause avoidance or behavioural changes, however, the intensity and duration of these activities are limited and are unlikely to result in injury, long-term displacement, or population-level effects, this impact will be brought to Stage 2 on a precautionary basis to assess further	Y - Connectivity established, will be brought forward for Stage 2 assessment
Galway Bay Complex SAC [000268]	Bottlenose dolphin (*Tursiops truncatus*) [1349]	**Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	Survey operations may produce low-intensity noise potentially causing temporary avoidance or behavioural changes in bottlenose dolphin and as a result this impact will be brought to Stage 2 for assessment. Physical disturbance due to vessel and equipment presence and operation may also cause avoidance or behavioural changes, however, the intensity and duration of these activities are limited and are unlikely to result in injury, long-term displacement, or population-level effects, this impact will be brought to Stage 2 on a precautionary basis to assess further	Y - Connectivity established, will be brought forward for Stage 2 assessment
Lower River Shannon SAC [002165	Bottlenose dolphin (*Tursiops truncatus*) [1349]	**Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	Survey operations may produce low-intensity noise potentially causing temporary avoidance or behavioural changes in bottlenose dolphin and as a result this impact will be brought to Stage 2 for assessment. Physical disturbance due to vessel and equipment presence and operation may also cause avoidance or behavioural changes, however, the intensity and duration of these activities are limited and are unlikely to result in injury, long-term displacement, or population-level effects, this impact will be brought to Stage 2 on a precautionary basis to assess further	Y - Connectivity established, will be brought forward for Stage 2 assessment

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
Cliffs of Moher SPA [004005]	Fulmar (*Fulmaris glacialis)* [A009]	**Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	The project takes place within the Fulmar's mean foraging range. Given the project's limited duration and spatial extent, disturbance is expected to be temporary and localised, with minimal risk of causing long-term behavioural changes or population-level effects	N - No credible pathway, screened out at Stage 1
	Kittiwake (*Rissa tridactyla*) [A188]		Kittiwakes are surface-feeding seabirds that breed on sea cliffs and forage over wide pelagic areas. While the proposed survey activities occur within the species' typical foraging range, the temporary and low-intensity nature of the surveys, combined with the species' broad foraging habits, significantly reduces the likelihood of any meaningful disturbance. Acoustic emissions and vessel movements are expected to be temporary and highly localised, with no realistic potential to affect population-level foraging success or breeding outcomes. On this basis and considering the absence of direct spatial overlap with nesting sites, the risk of adverse effects is negligible. Therefore, a reasonable conclusion can be drawn to screen out Kittiwake at Stage 1.	N - No credible pathway, screened out at Stage 1
	Guillemot (*Uria aalge*) [A199]		Guillemot breed on cliff ledges; however, the proposed marine survey activities are temporary, intermittent, and confined to offshore and subtidal waters, with no interaction with cliff nesting habitats. Vessel presence and underwater noise levels associated with the surveys are low in intensity and short in duration and are not of a nature or scale that would disturb breeding birds or affect foraging success at a population-relevant level. Any behavioural response would be brief, localised, and reversible, and therefore can be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1
	Razorbill (*Alca torda*) [A200]		Razorbill breed on cliff ledges; however, the proposed marine survey activities are temporary, intermittent, and restricted to offshore and subtidal waters, with no interaction with cliff nesting habitats. The scale, duration, and intensity of vessel activity and associated underwater noise are not sufficient to cause sustained disturbance or displacement of breeding or foraging razorbill at a population-relevant level. Any behavioural response would be short-term, localised, and reversible, and would and therefore can be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1
	Puffin (*Fratercula arctica*) [A204]		Puffin breed in burrows and crevices associated with cliff-top and island habitats; however, the proposed marine survey activities are temporary, intermittent, and confined to offshore and subtidal waters, with no interaction with breeding habitats. The nature, scale, and duration of vessel activity and associated underwater noise are not sufficient to cause sustained disturbance or displacement of puffin during the breeding season. Any behavioural response would be brief, localised, and reversible, and therefore can be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1.

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
	Chough (*Pyrrhocorax pyrrhocorax*) [A346]		Chough are terrestrial foragers using coastal grasslands and pastures adjacent to nesting cliffs. They do not rely on estuarine or subtidal where the proposed surveys will occur. No source–pathway–receptor link exist and the species can reasonably be screened out at Stage 1	N - No credible pathway, screened out at Stage 1
Mid-Clare Coast SPA [004182]	Cormorant (*Phalacrocorax carbo*) [A017]	**Impact Mechanism 2: Noise and Vibration** **Impact Mechanism 3: Physical Disturbance**	Cormorant are associated with coastal cliffs and nearshore waters; however, the proposed marine survey activities are temporary, intermittent, and limited in spatial extent, with no interaction with breeding, roosting, or nesting habitats. Vessel movements and associated noise will be low in intensity and short in duration and are not of a nature or scale likely to result in sustained disturbance or displacement of cormorant at a population-relevant level and the species can reasonably be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1
	Barnacle Goose (*Branta leucopsis*) [A045]		Primarily forages on terrestrial grasslands away from marine and intertidal habitats where the proposed surveys occur. No credible source-pathway-receptor linkage between spills/leakages, vessel movements or noise/disturbance from marine survey activities and the species' feeding grounds. Disturbance potential related to the proposed marine surveys is considered negligible, and indirect habitat influences via aquatic disturbance pathways can be excluded and the species can reasonably be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1
	Ringed Plover (*Charadrius hiaticula*) [A137]		Ringed Plover is listed as a non-breeding SCI for the SPA. While Ringed Plover breeds on parts of the Irish coast, there is no evidence of core breeding habitat within the marine survey footprint or adjacent subtidal zone, and the proposed activities will not interact with intertidal nesting or roosting areas. Vessel movements will be temporary and offshore, resulting in only brief, localised and reversible disturbance, with no potential to affect SPA conservation objectives. Ringed Plover can therefore be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1
	Sanderling (*Calidris alba*) [A144]		Non-breeding SCI within the SPA, occurring along exposed sandy and shingle shorelines. While the species may forage or roost within intertidal habitats of Liscannor Bay, the proposed activities are temporary, low-intensity and confined to offshore waters, with no activities within the intertidal zone or roosting areas. Any disturbance would be brief, localised and reversible, with no potential to affect SPA conservation objectives and can reasonably be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1
	Purple Sandpiper (*Calidris maritima*) [A148]		Non-breeding SCI within the SPA, associated with rocky shorelines and intertidal reef habitats. Although the species may occur along the west Clare coast, the survey activities are offshore and temporary, with no interaction with intertidal foraging or roosting areas. Any behavioural response would be minor and short-lived and would not affect the conservation objectives of the SPA and can reasonably be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
	Dunlin (*Calidris alpina*) [A149]		Non-breeding SCI within the SPA. While individuals may forage or roost along intertidal flats in the wider area, the proposed activities will take place offshore, are short in duration, and will not result in habitat loss or disturbance to key feeding/roosting areas. No population-level effects can arise and can reasonably be screened out at Stage 1	N - No credible pathway, screened out at Stage 1
	Turnstone (*Arenaria interpres*) [A169]		Non-breeding SCI within the SPA, associated with rocky intertidal habitats. Presence in the wider Liscannor Bay area is acknowledged; however, the proposed activities are offshore, temporary and of low acoustic and visual intensity, with no interaction with intertidal habitat. Disturbance, if any, would be brief and localised and would not undermine the SPA's conservation objectives and the SCI can reasonably be screened out at Stage 1	N - No credible pathway, screened out at Stage 1
	Wetland and Waterbirds [A999]		No connectivity established due to scale of project and spatial separation and the SCI can reasonably be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1
Inishmore SPA [004152]	Kittiwake (*Rissa tridactyla*) [A188]	**Impact Mechanism 2: Noise and Vibration**	Surface-feeding seabirds that breed on sea cliffs and forage over wide pelagic areas. While the proposed survey activities occur within the species' typical foraging range, the temporary and low-intensity nature of the survey, combined with the species' broad foraging habits, significantly reduces the likelihood of any meaningful disturbance. Acoustic emissions and vessel movements are expected to be temporary and highly localised, with no realistic potential to affect population-level foraging success or breeding outcomes. On this basis and considering the absence of direct spatial overlap with nesting sites, the risk of adverse effects is negligible. Therefore, a reasonable conclusion can be drawn to screen out at Stage 1.	N - No credible pathway, screened out at Stage 1
	Arctic Tern (*Sterna paradisaea*) [A194]	**Impact Mechanism 3: Physical Disturbance**	Although occasional passage through the wider survey area cannot be entirely ruled out, the proposed activities remain well outside the core foraging and breeding range of this species. The spatial separation, combined with the temporary and highly localised nature of the activities, means there is no realistic pathway for significant disturbance or adverse effects on conservation objectives. On this basis, connectivity is considered negligible, and the species can be reasonably screened out at Stage 1.	N - No credible pathway, screened out at Stage 1

Site	Conservation Feature	Impact Mechanism	S-P-R Assessment	Brought to Stage 2 (Y/N)
	Guillemot (*Uria aalge*) [A199]		Breed within the wider region and may occasionally forage or pass through the survey area. However, the proposed activities are temporary, highly localised, and occur outside core breeding sites. While vessel movements and associated noise could theoretically cause temporary disturbance, the species' broad foraging range and mobility significantly reduce the likelihood of any meaningful impact on foraging success or breeding outcomes. On this basis, the risk of adverse effects is considered negligible, and the SCI can reasonably be screened out at Stage 1.	N - No credible pathway, screened out at Stage 1
	Little Tern (*Sternula albifrons*) [A885]		Although occasional passage through the wider survey area cannot be entirely ruled out, the proposed activities remain well outside the core foraging and breeding range of this species. The spatial separation, combined with the temporary and highly localised nature of the activities, means there is no realistic pathway for significant disturbance or adverse effects on conservation objectives. On this basis, connectivity is considered negligible, and the species can be reasonably screened out at Stage 1.	N - No credible pathway, screened out at Stage 1

2.6.1. Assessment of Mobile Annex II Marine Species

Due to the foraging ranges of Annex II marine mammal species found in Irish waters, the following species listed as QIs in SACs in Ireland have been assessed in terms of their potential to occur in the Project area:

- Harbour seal (*Phoca vitulina*)
- Grey seal (*Halichoerus grypus*)
- Harbour porpoise (*Phocoena phocoena*)
- Bottlenose dolphin (*Tursiops truncatus*)

Two species of pinniped, the grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*), inhabit Irish waters year-round and are recorded along the south Irish coast. Both are listed as species of Least Concern on the IUCN Red List (Bowen, 2016; Lowry, 2016).

Both species have established haul-out sites along all coastlines of Ireland for resting, breeding, and engaging in social activity (Ó Cadhla *et al*., 2007). The largest proportion of the grey seal population is hauled out ashore during the annual moult which begins in November and continues until April. Grey seals also aggregate in large colonies during the breeding season between August and December (Ó Cadhla *et al*., 2007), with peak pup production during October and November. Grey seals tend to breed on exposed rocky shores, on sandbars or in sea caves with ready access to deeper water.

The nearest designated sites for Grey Seal (*Halichoerus grypus*) and Harbour Seal (*Phoca vitulina*) are Slyne Head Islands SAC [000328] (78.6 km from the activities area) and Kilkieran Bay and Islands SAC [002111] (39.7 km from the activities area), respectively. There are no established haul-out sites or core resting areas for either species within Liscannor Bay (Ó Cadhla *et al*., 2007; NPWS conservation objectives), and only infrequent sightings have been recorded locally (NBDC, 2025). Any interaction is therefore expected to involve occasional transient individuals. On this basis, the risk of likely significant effects on seal species arising from the proposed survey activities is considered to be very low.

More than 25 species of cetaceans have been recorded in Irish waters (NBDC, 2023), with 11 of these regularly occurring in the Bay (NBDC, 2025).

The harbour porpoise is the most widespread and frequently recorded species in Irish waters, sighted largely in inshore waters in the Celtic Sea throughout the entire year (Ó Cadhla *et al*., 2004; Berrow *et al*., 2010; Wall *et al*., 2013; Rogan *et al*., 2018). Porpoise sightings tend to differ by season, with densities peaking in summer (Berrow et al., 2010). They are listed as a species of Least Concern on the International Union for Conservation of Nature (IUCN) Red List (Braulik *et al*., 2020).

Bottlenose dolphins are one of the most frequently recorded cetaceans in Ireland (NPWS, 2019) and have been observed throughout Irish waters year-round. They are listed as a species of Least Concern on the IUCN Red List (Wells *et al*., 2019).

Bottlenose dolphins are one of the most frequently recorded cetaceans in Ireland (NPWS, 2019) and have been observed throughout Irish waters year-round. Two principal inshore bottlenose dolphin populations are recognised along the west coast of Ireland: the Lower River Shannon population and the West Connaught (Connemara) coastal population, both designated as Annex II qualifying interests within relevant SACs. These populations exhibit strong site fidelity within core areas, while also demonstrating the capacity for wider coastal movements, as evidenced by photo-identification and regional survey data. The resident Shannon population makes the Shannon Estuary one of the most important habitats for cetaceans in Ireland and Europe (O' Brien *et al*., 2009; Rogan *et al*., 2018). Standardised boat surveys combined with mark–recapture photo-identification in the Lower River Shannon SAC (June–October 2018) estimated a total population of 139 bottlenose dolphins (95% CI: 121–160; CV = 0.109), within the range of previous estimates since 1997 thus indicating a stable population size (Rogan *et al*., 2018). The population size estimated by Rogan et al., 2018 was similar to that estimated by Blázquez *et al.,* 2020, based on surveys conducted in 2015 which provided an abundance of 145 extant individuals. Year-round surveys have shown a seasonal reduction in the number of bottlenose dolphins present within the estuary in winter which suggests the home range of this population extends beyond the extent of the Lower Shannon River SAC (Rogan *et al*., 2018). They are listed as a species of Least Concern on the IUCN Red List (Wells *et al*., 2019).

Bottlenose dolphins are known to occur intermittently along the west Clare coastline; however, available data indicate that Liscannor Bay does not form part of a recognised core use area, breeding site, or resident range for either population. Records from the wider region suggest that dolphin presence in this area is best characterised as occasional and transient rather than regular or sustained.

On this basis, SACs associated with the Shannon and West Connacht populations are included in this assessment to reflect potential population-level connectivity under a precautionary screening approach, rather than to imply routine use of the Project area. (NBDC, 2025).

They are listed as a species of Least Concern on the IUCN Red List (Wells *et al*., 2019), with the relevant SACs designated for Annex II marine mammal species are detailed in **Table 2-7**.

Table 2-7 note: *Distances to SACs are provided to illustrate potential spatial connectivity between the Project and designated cetacean populations. Cetaceans are highly mobile and do not forage within fixed radial distances from SAC boundaries; therefore, SAC distance is not used as a screening threshold but as contextual information within a pathway-based assessment*.

Table 2-7: Special Area of Conservation (SAC) and designated Annex II and Annex IV marine mammal species distance to the proposed project area.

SAC (Site code)	Qualifying Interest				
	Harbour seal (*Phoca vitulina*) (1365)	Grey seal (*Halichoerus grypus*) (1364)	Harbour porpoise (*Phocoena phocoena*) (1351)	Bottlenose dolphin (*Tursiops truncatus*) (1349)	Distance from Site
Slyne Head Peninsula SAC [002074]				✓	**75.9**
West Connacht Coast SAC [002998]			✓	✓	**84.1**
Slyne Head Islands SAC [000328]		✓		✓	**78.6**
Inishbofin and Inishshark SAC [000278]		✓			**101.4**
Kilkieran Bay and Islands SAC [002111]	✓		✓		**39.7**
Clew Bay Complex SAC [001482]	✓				**152.3**
Duvillaun Islands SAC [000495]		✓		✓	**155**
Galway Bay Complex SAC [000268]	✓				**45.4**
Killala Bay/Moy Estuary SAC [000458]	✓				**251.1**
Lower River Shannon SAC [002165]				✓	**55.4**
Ballysadare Bay SAC [000622]	✓				**283.6**
Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC [000627]	✓				**285.1**
Blasket Islands SAC [002172]		✓	✓		**117.7**
Slieve Tooey/Tormore Island/Loughros Beg Bay SAC [000190]		✓			**283.8**
Donegal Bay (Murvagh) SAC [000133]	✓				**308.7**
West of Ardara/Maas Road SAC [000197]	✓				**296.3**
Kenmare River SAC [002158]	✓		✓		**180.7**
Rutland Island and Sound SA [002283]	✓				**307**
Glengarriff Harbour and Woodland SAC [000090]	✓				**256.9**
Roaringwater Bay and Islands SAC [000101]		✓	✓		**253.8**
Horn Head and Rinclevan SAC [000147]		✓			**353.3**
Slaney River Valley SAC [000781]	✓				**521.8**

SAC (Site code)	Qualifying Interest				
	Harbour seal (*Phoca vitulina*) (1365)	**Grey seal (*Halichoerus grypus*) (1364)**	**Harbour porpoise (*Phocoena phocoena*) (1351)**	**Bottlenose dolphin (*Tursiops truncatus*) (1349)**	**Distance from Site**
Rockabill to Dalkey Island SAC [003000]			✓		**626.5**
Lambay Island SAC [000204]	✓	✓	✓		**652.8**
Saltee Islands SAC [000707]		✓			**484.8**
St. John's Point SAC [000191]				✓	**332.8**
Inishmore Island SAC [000213]			✓		**26.4**
Porcupine Bank Canyon SAC [003001]				✓	**396.3**
South-west Porcupine Bank SAC [002329]				✓	**383.4**
Belgica Mound Province SAC [002327]			✓	✓	**223.5**
Hook Head SAC [000764]			✓	✓	**452.2**
Carnsore Point SAC [002269]			✓		**494.3**
Blackwater Bank SAC [002953]			✓		**508.5**
Bunduff Lough and Machair Trawalua/Mullaghmore SAC [000625]			✓		**301.6**
Codling Fault Zone SAC [003015]			✓		**614.2**
Lough Swilly SAC [002287]			✓		**409.5**
Gweedore Bay and Islands SAC [001141]			✓		**319.5**

Noise Disturbance to Habitats Directive Annex II Species

The proposed survey activities and associated vessel movements have the potential to generate underwater noise and vibration, causing temporary and temporary disturbance to sensitive marine fauna, particularly marine mammals, which may respond through avoidance behaviour.

Marine mammals rely on sound to navigate, communicate and forage. Where the frequency of anthropogenic noise overlaps with that used by marine mammals, their ability to detect important signals may be reduced — a phenomenon termed acoustic masking (Weilgart, 2007; Wright *et al*., 2007; Richardson *et al*., 1995). Masking of vocalisations can lead to increased ambiguity of information and, in extreme circumstances, may impair orientation, foraging efficiency, or predator avoidance (Wright et al., 2007).

The potential effects of noise disturbance range from behavioural responses to auditory injury, physical harm, and, in extreme cases, mortality. Southall et al. (2008) categorised seals and cetaceans into functional groups based on audiometric data and comparative anatomy, with pinnipeds assessed both in air and in water. These functional groups provide a framework for understanding the susceptibility of different marine mammal taxa to underwater noise.

On this basis, likely significant effects on the presence, abundance and sensitivity of qualifying species within nearby European sites cannot be excluded. The potential for disturbance must therefore be considered further at Stage 2 Appropriate Assessment in the context of the sites' conservation objectives.

Table 2-8: Functional frequencies of various cetaceans and pinnipeds found in Irish waters (adapted from Southall *et al.* (2007 & 2019)).

Hearing Group	Species in Irish Waters (examples)	Functional Hearing Range (approx.)	Key Sensitivities
Low-Frequency (LF) Cetaceans	Baleen whales (Minke, Fin, Humpback, Blue, Sei)	7 Hz – 35 kHz	Highly sensitive to low-frequency impulsive and continuous noise (pile driving, dredging, vessel noise).
Mid-Frequency (MF) Cetaceans	Dolphins (Bottlenose, Common, Striped, Pilot whales, Killer whales)	150 Hz – 160 kHz	Sensitive to mid-frequency broadband noise (sonar, vessel engines, dredgers).
High-Frequency (HF/VHF) Cetaceans	Harbour porpoise	275 Hz – 160 kHz (peak ~120–140 kHz)	Most sensitive of all groups; disturbance at low received levels, particularly from impulsive sources.

Hearing Group	Species in Irish Waters (examples)	Functional Hearing Range (approx.)	Key Sensitivities
Phocid Pinnipeds in Water (PCW)	Grey seal, Harbour seal	50 Hz – 86 kHz	Sensitive to both impulsive and continuous sources at lower to mid-frequencies.
Phocid Pinnipeds in Air (PCA)	Grey seal, Harbour seal	75 Hz – 30 kHz	More limited sensitivity than underwater hearing.

The proposed surveys have the potential to give rise to temporary underwater noise and physical disturbance within the project footprint and surrounding waters. Given the location of the surveys, the absence of core seal haul-outs in the Bay, the likelihood of significant effects on these species is considered low.

However, bottlenose dolphins (*Tursiops truncatus*) and harbour porpoise (*Phocoena phocoena*), which occur widely in Irish waters and are highly sensitive to acoustic disturbance, represent the most relevant receptors for potential impact. While predicted noise levels are not expected to cause permanent auditory injury, temporary disturbance, acoustic masking, and displacement within the zone of influence remain possible, particularly during periods drilling and bathymetric surveying.

In the absence of mitigation, there remains potential for temporary and localised behavioural effects on qualifying Annex II marine species. These effects must be considered further at Stage 2 Appropriate Assessment, and targeted mitigation measures will be required to ensure no adverse effects on the integrity of relevant European sites.

The Eurasian otter is a top predator in freshwater systems; thus, its presence has a significant role in the well-being of these ecosystems (Reid *et al*., 2013a). Aquatic prey and shelter availability are two basic requirements in the growth of otter populations. This species is strictly protected under Annex II and IV of the Habitats Directive, thus requires Member States to designate SACs for their protection. Otters have also been designated as species of conservation concern and high priority, due to major decline in numbers because of alterations in water quality chemistry (eutrophication) in river and estuaries habitats, habitat destruction, and introduction of alien invasive species (Reid *et al.,* 2013a; Gutleb *et al.* 1998; Leppakoski *et al*., 2002). Consequently, otters have been designated as 'sentinel species' for the dynamics and diversity of pesticides in aquatic food webs (Reid *et al*., 2013a; Lemarchand *et al*., 2011). The Eurasian otter is currently listed as Near Threatened on the IUCN Red List global assessment of the species (Loy *et al.*, 2022). In Ireland, the species is widespread throughout the country and there are 44 SACs[11] with otter as a QI, with associated habitats ranging from estuaries, lakes, coastal lagoons, dunes and alluvial forests (Bailey and Rochford 2006.

Although otter (*Lutra lutra*) may occur sporadically along the wider west Clare coastline, the closest hydrologically linked SAC with otter as a QI is Galway Bay Complex SAC over 45km away. The proposed survey activities are temporary, localised, and confined to subtidal and offshore environments, with no survey along established otter resting or breeding sites. With no credible pathway for disturbance affecting SAC conservation objectives, otter can be screened out at Stage 1.

Overall, the proposed surveys could generate temporary underwater noise and physical disturbance within the project footprint and adjacent waters. There are no core seal haul-outs in the Bay, and no SACs for otter in proximity, so the likelihood of significant effects on these species is considered very low. Bottlenose dolphin and harbour porpoise, both present year-round and highly sensitive to acoustic disturbance, are the primary receptors of concern, with foraging ranges that overlap with the project area (**Table 2-7**). The nearest designated for bottlenose dolphins is the Lower Shannon River SAC [002165], approximately 55.4 km from the proposed surveys. The nearest SAC designated for the protection of Harbour Porpoise is the Inishmore Island SAC [000213], which has been considered in the SACs within the Zone of Influence.

The predicted noise levels from standard survey activities are below thresholds for auditory injury or temporary threshold shift, but temporary disturbance, acoustic masking, or reversible displacement remain possible for individuals within the zone of influence. Although most exposures will result only in short-lived and localised behavioural effects, the risk of significant effects cannot be excluded without further assessment. Therefore, using a precautionary approach aligned with OPR/NPWS screening guidance, **a Stage 2 Appropriate Assessment will be undertaken for bottlenose dolphin and harbour porpoise** in relevant SACs to ensure no adverse effects on the integrity of relevant European Sites (**see Table 2-11**).

2.7. Plans or Projects That Might Act in Combination

As outlined in above the obligation to undertake AA under the 2011 Birds and Natural Habitats Regulations derives from the Habitats Directive. Regulation 42(1) of the 2011 Regulations 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*.

It is therefore required that the potential impacts of the proposed Project be considered in combination with other relevant plans or projects. Given the nature of the proposed activities associated with the Project, the potential project impact mechanisms (or sources of impact) are:

1. Pollution of marine environment from spills/leakages
2. Noise and vibration
3. Physical disturbance

The assessment of potential in-combination effects considers other plans and projects that may result in significant effects to QIs and SCIs of SACs and SPAs. To inform the assessment of potential in-combination effects a review of consent applications for projects in the vicinity of the proposed Project included on the following websites was completed in September 2025:

- DHPLG - EIA Portal[12]
- Clare County Council - Planning System[13]
- An Coimisiún Pleanála[14]
- Aquaculture Information Management System (AQUAMIS) by DAFM[15]
- Irelands Marine Atlas[16]
- MARA Licence Applications[17]

2.7.1. Threats and Pressures

The Natura 2000 Standard Data Form for the Inagh River Estuary SAC [000036] identifies a variety of pressures affecting estuarine habitats and qualifying interests as seen below in (**Table 2-9**).

Table 2-9: Ranked threats and pressures identified for the Inagh River and Estuary SAC.

Rank	Threats and Pressures [code]	*Occurrence	Relevance to Liscannor
High	Agricultural Intensification [A02.01]	i	Run-off and drainage from the Inagh catchment can increase nutrients/fines, driving marsh accretion/erosion shifts and vegetation change.
High	Modifying structures of inland water courses [J02.05.02]	i	Channel works/weirs on the Inagh alter freshwater and sediment delivery to the estuary, affecting saltmarsh zonation and stability.
High	Sea defence or coast protection works, tidal barrages [J02.12.01]	b	Hard defences (seawalls/groynes) around Lahinch/Liscannor interrupt sediment transport and cause coastal squeeze—loss of fringing saltmarsh.
Low	Invasive non-native species [I01]	i	Risk of dunes becoming colonised by invasive species.
Low	Reclamation of land from sea, estuary or marsh [J02.01.02]	i	Direct loss/fragmentation of saltmarsh and hydrological cut-off; legacy embankments limit natural marsh migration.
Low	Other siltation rate changes [J02.11.02]	i	Altered sediment budgets (catchment works or in-bay activity) can smother pioneer 1310 zones, shift 1330/1410 extent, and reduce sand supply, increasing dune erosion risk.

*Occurrence: **I = inside, o = outside, b = both**

The Cliffs of Moher SPA supports several bird species which can be impacted by pressures mentioned below in (**Table 2-10**). The proposed surveys are far enough away from the Cliffs of Moher and as such, likely significant effects can be excluded due to the in-combination effect of the proposed surveys, and other projects occurring in the area.

Table 2-10: Threats and pressures identified for the Cliffs of Moher SPA.

Rank	Threats and Pressures [code]	Occurrence	Relevance to Liscannor
High	Walking, horseriding and non-motorised vehicles [G01.02]	i	High visitor pressure on cliff-tops can cause disturbance to nesting seabirds (kittiwake, guillemot, razorbill, fulmar) and trampling of foraging habitats for chough.
Medium	Interpretive centres [G03]	o	The visitor centre and associated facilities at the Cliffs can contribute to sustained human activity levels, indirectly increasing disturbance risk to cliff-nesting seabirds and reducing the quality of adjacent foraging areas for chough.
Medium	Noise nuisance, noise pollution [H06.01]	o	Concentrated tourist presence and associated traffic/noise can disturb breeding seabirds on cliff ledges and displace chough from traditional feeding areas if disturbance is chronic.

*Occurrence: **I = inside, o = outside, b = both**

2.7.2. Plans

From the planning resources cited in **Section 2.7**, the Clare County Development Plan 2023–2029 establishes the guiding framework for this work. Ennistymon and Lahinch are identified as a combined "Service Town" in recognition of their shared role as key local hubs. Situated about 2.5 km apart and linked by the N67, both settlements offer retail, business, and employment opportunities, while Lahinch also serves as a significant national and international tourist destination.

The Core Strategy confirms that local growth should be accommodated in line with each settlement's size and function. Policy CDP 4.5, specific to Service Towns, includes a provision to "monitor the cumulative effect of planning permissions on available wastewater capacity, where connection to a public wastewater treatment plant is included as part of a development proposal."

The proposed surveys—Area A in Liscannor Bay and Area B at the Ennistymon waterfall—will directly inform the design of new wastewater treatment facilities for Ennistymon and Lahinch. This infrastructure is expressly supported by the Development Plan, which seeks to remedy existing environmental shortcomings and enable sustainable expansion.

2.7.3. Projects

The Cliffs of Moher Coastal Walk is a premier Wild Atlantic Way attraction, drawing international visitors along its approximately 18 km route from Doolin in the north to Hags Head in the south. In April 2025, Clare County Council published a dedicated management plan for the walk.

Key priorities in the plan include upgrading trail surfaces and drainage, improving signage and waymarking, reinforcing fencing, and repairing cliff-edge structures and safety barriers. Visitor-flow measures, such as one-way systems at peak times are also introduced to protect sensitive habitats.

All upgrade works are small-scale, time-limited interventions confined to the existing trail corridor. Each phase is subject to environmental safeguards and scheduled to avoid ecologically sensitive periods such as seabird breeding. Clare County Council's Coastal Zone Management policies and the Cliffs of Moher Coastal Walk Management Plan (2025) make no provision for commercial marine traffic beyond small-scale maintenance vessels, underscoring the lack of scheduled tourism or transport services in the immediate vicinity.

Given their confined footprint, short duration, and robust mitigation, these Coastal Walk upgrades can be excluded from causing any likely significant effects in-combination with the proposed surveying.

2.7.4. Aquaculture Operations

Consultation of the DAFM AQUAMIS viewer[15] (June 2025) confirms there are no active or proposed aquaculture licences within the Zone of Influence or immediate vicinity of the survey areas.

2.7.5. Initiatives

An initiative, 'Building a Marine Strategic Alliance in County Clare', is currently being undertaken. The Local Biodiversity Action Fund from the National Parks and Wildlife Service and Clare county Council, a collaboration between the Irish Whale and Dolphin Group and Banner Gleo: Liscannor Bay Association aims to build knowledge on the marine biodiversity of Liscannor Bay, including aims to survey seal haul-out sites in the Bay[18].

2.7.6. Navigational and Marine Traffic

Ireland's Marine Atlas data for Liscannor Bay does not record any shipping lanes, ferry routes, or regular vessel traffic through Area A. Recreational boating levels are known to be low and seasonal. The Atlas shows bait fishing activity inside and immediately outside Liscannor Bay dating back to 2013, with zero vessels currently operating. Consequently, likely significant effects can be excluded for navigational and marine traffic in the bay in combination with the planned surveys.

2.7.7. Diffuse and Point Source Pollution

Background nutrient enrichment in Liscannor Bay and the Cullenagh River at Ennistymon arises primarily from agricultural run-off and existing wastewater discharges. The survey activities in Areas A and B are temporary, confined to discrete locations, and will not introduce additional pollutants or nutrients. Consequently, they are unlikely to materially exacerbate current water-quality pressures.

All survey vessels will adhere to best-practice fuel-spill prevention and waste-management protocols. Equipment will be inspected and cleaned between stations to minimise the transfer of invasive species or contaminants.

The surveys will therefore not give rise to any realistic pathway for cumulative or in-combination effects on the conservation objectives of the Inagh River and Estuary SAC or the special conservation interests of the Cliffs of Moher SPA.

2.7.8. Conclusion

No adverse in-combination effects are anticipated between the proposed surveys and other plans, projects or activities in the Zone of Influence:

- Clare County Development Plan 2023–2029 – Ennistymon and Lahinch Service Town objectives (CDP 4.5) explicitly support wastewater infrastructure upgrades, and the Plan has undergone AA with no integrity impacts. The temporary, low-intensity surveys will not conflict with the Plan's environmental safeguards and cumulative effects can be excluded.

- Cliffs of Moher Coastal Walk Management Plan (2025) – Ongoing trail upgrades (surface and drainage works, signage, structural repairs, visitor-flow management) are discrete, temporary interventions within the existing corridor. Robust mitigation and phased scheduling avoid ecologically sensitive periods, providing no pathway for cumulative impacts with the proposed surveys.
- Navigational and Marine Traffic – Ireland's Marine Atlas shows no shipping lanes, ferry routes or regular vessel traffic in Liscannor Bay. Recreational boating is low and seasonal, and bait-fishing records indicate zero vessels in the survey zone. Likely significant effects from navigational interactions can therefore be excluded.
- Diffuse and Point-Source Pollution – Background nutrient enrichment from agricultural run-off and existing discharges in Liscannor Bay and the Cullenagh River is unchanged by the surveys. All vessels will follow fuel-spill and waste-management protocols, and equipment will be cleaned between stations, ensuring no additional pollution pathways.

Each activity is spatially discrete, time-limited and subject to its own environmental controls. Consequently, the proposed survey campaigns will not give rise to likely significant effects on any European site.

2.8. Screening Outcome

The assessment has determined, in light of best available scientific data, that there is potential for significant effects on conservation features of SACs and SPAs resulting from the Project, *i.e.,* the likelihood of significant effects on all European sites has not been ruled out. Therefore, it is recommended that this Project be brought forward to Stage 2 Appropriate Assessment. The assessment determined that there is potential likelihood for significant effects from the Project in combination with other plans or projects. The assessment will therefore be brought forward to Stage 2 – Natura Impact Statement (NIS). The findings of the assessment are summarised in **Table 2-11**.

Table 2-11: Summary of the Appropriate Assessment Screening outcome.

AA Screening outcome	
Brief description of the Project.	Site investigation surveys are proposed in Liscannor Bay and the Cullenagh River, Ennistymon, to inform the design and assessment for a new Lahinch & Ennistymon Wastewater Treatment Plant and marine outfall. The survey programme includes bathymetric, geophysical, intertidal and subtidal habitat surveys, sediment and water sampling, and boreholes where required. The surveys will establish baseline environmental and technical data to support the assessment and design of a compliant WWTP and marine outfall, ensuring environmental protection and regulatory compliance.
Assessment summary	
Description of the potential impact mechanisms from the Project that have likely significant effects on the conservation features.	All potential impact mechanisms are detailed in **Section 2.3**. Here follows the impact mechanisms for which likely significant effects have been identified: 1. Noise and vibration 2. Physical disturbance
Conservation features with the potential to be impacted by the Project.	• Harbour Porpoise (*Phocoena phocoena*) [1351] - West Connacht Coast SAC [002998] - Kilkieran Bay and Islands SAC [002111] - Inishmore Island SAC [000213] • Bottlenose dolphin (*Tursiops truncatus*) [1349] - Slyne Head Peninsula SAC [002074] - West Connacht Coast SAC [002998] - Slyne Head Islands SAC [000328] - Galway Bay Complex SAC [000268] - Lower River Shannon SAC [002165]
Description of the potential direct or indirect impacts of the Project in combination with other plans or projects on the European sites.	No plans or projects identified to have potential in combination effects with the surveys proposed in Liscannor Bay
Conservation features with the potential to be impacted by the Project in combination with other plans or projects.	None

Concluding statement.	It is concluded that there is a potential pathway between the Project impact mechanisms, alone or in combination with other plans or projects, and the conservation features of European sites. Therefore this assessment will be brought forward to a Stage 2 Screening (NIS). The assessment is presented in full in **section 2.5 - section 2.7**

3. Stage 2: Natura Impact Statement

3.1. Overview

Stage 2 of the Appropriate Assessment process considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a European site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The proponent of the plan or project will be required to submit a Natura Impact Statement (NIS), that examines the plan or project and the relevant European sites, to identify and characterise any possible implications for the site in view of the site's conservation objectives, accounting for in-combination effects. This should provide information to enable the competent authority to carry out the appropriate assessment. If the assessment deems that adverse effects on the integrity of a site cannot be excluded, then the process must proceed to Stage 3, or the plan or project should be abandoned.

Regarding the European sites and their associated conservation features identified in the ZoI of the Project, which were not excluded in Stage 1, an appropriate assessment is required to identify the impacts associated with the Project that may have a significant adverse impact. A summary of the screening outcome from the Stage 1 AA Screening can be found in **Screening Outcome 2.8**.

This NIS gives a detailed ecological assessment of European sites and their associated conservation features, considering *inter alia* site-specific or activity-specific impacts. In preparation of this NIS, the NPWS-DELGH (2009; revised 2010)/NPWS-DAHG (2012) guidance document on marine NIS in SACs was used.

In line with NPWS-DEHLG (2009; revised 2010) guidance, the Stage 2 AA consists of three main steps:

1. **Impact Prediction** - where the likely impacts of the Project are examined. A source-pathway-receptor model has been used to assess potential for impact.
2. **Assessment of Effects** – where the effects of the Project are assessed as to whether they have any adverse effects on the integrity of European Sites as defined by conservation objectives.
3. **Mitigation Measures** – where mitigation measures are identified to ameliorate any adverse effects on the integrity of any European site.

3.2. Impact Prediction

The following sections consider the risk of potential effects associated with Impact mechanisms 2 to 3. The assessment of potential impacts from the proposed Project on conservation features considered the negative threats and pressures affecting the conservation objectives of these conservation features as listed on the NPWS website (NPWS SAC and SPA). These species are conservation features of Inishmore Island SAC [000213], Slyne Head Peninsula SAC [002074], West Connacht Coast SAC [002998], Slyne Head Islands SAC [000328], Galway Bay Complex SAC [000268] and Lower River Shannon SAC [002165]

1. Noise and vibration
2. Physical Disturbance

Wide ranging species with the potential to be impacted are also considered.

Table 3-1 presents a quick reference summary of the project impact mechanisms listed above with regards to the conservation features.

Table 3-1: Impact mechanisms relevant to the conservation features.

Ecological Group	Conservation feature [code]	Impact Mechanism	
		1. Noise and vibration	2. Physical disturbance
Annex II marine mammal species	Harbour porpoise (*Phocoena phocoena*) [1351]	Potential Direct Effect	Potential Direct Effect
Annex II marine mammal species	Bottlenose dolphin (*Tursiops truncatus*) [1349]	Potential Direct Effect	Potential Direct Effect

3.2.1. Potential Impact Mechanism 1 – Noise and Vibration

The proposed intrusive geotechnical and geophysical surveys, along with associated vessel movements have the potential to generate underwater noise and vibration, which may cause temporary disturbance to sensitive marine fauna.

Survey equipment including drills, sediment sampling and core collection, bathymetric surveys and, support vessels produce moderate to high levels of underwater acoustic emissions that may disrupt normal behaviour, including foraging, communication, or navigation. Species listed under Annex II of the Habitats Directive, such as the harbour porpoise (*Phocoena phocoena*), are known to be particularly sensitive to anthropogenic noise. While the anticipated noise levels are not expected to result in permanent hearing damage or physical harm, there remains the potential for temporary behavioural disturbance within the zone of acoustic influence. The significance of such impacts depends on the presence, abundance, and sensitivity of qualifying species within nearby European Sites, and must therefore be assessed in the context of the conservation objectives of those sites.

3.2.1.1. Potential Receptors

Marine mammals – Habitats Directive (Annex II)

- Harbour porpoise [1351] – highly sensitive to acoustic disturbance and disturbance at relatively low noise levels.
- Bottlenose dolphin [1349] – sensitive to mid-frequency underwater noise; behavioural disturbance possible.

3.2.1.2. Impact Assessment

The proposed survey operations will generate both underwater noise (from vessel engines, and jack-up barge drilling) and airborne noise/vibration (from equipment and vessel activity). Marine mammals, including bottlenose dolphin and harbour porpoise may be exposed within the Projects zone of influence. Cetaceans are highly sensitive to acoustic disturbance, particularly harbour porpoise, which may respond at relatively low sound levels. Pinnipeds are less sensitive but may experience temporary behavioural disturbance when foraging near the activities. Other Annex IV species (such as common dolphin or migratory baleen whales) are less likely to occur in the Bay and therefore exposure risk is minimal.

Overall, noise and vibration impacts are expected to be localised, temporary, and reversible, but they cannot be excluded as a potential source of disturbance to designated features and species. Mitigation is therefore required.

3.2.1.3. Mitigation measures

Marine Mammals (Annex II species)

To mitigate potential disturbance to harbour porpoise and bottlenose populations, comprehensive mitigation measures will be applied during all survey activities, including drilling, vibrocore sampling, and vessel operations.

- A suitably qualified Marine Mammal Observer (MMO) will be appointed for the duration of activites. The MMO will conduct a 30-minute pre-start watch within 500 m of survey vessel or jack-up barge. If dolphins are observed within this zone, start-up will be delayed until animals have left, or a 30-minute clearance period has elapsed.
- A “ramp-up” or “soft start” procedure will be used to gradually introduce sound to the environment.
- If drilling is paused for more than 30 minutes, pre-start monitoring will be repeated before recommencement.
- Clear communication protocols will be established between the MMO and site management to control commencement and resumption of activity.
- Vessel speeds will be limited to reduce the risk of collision with marine mammals.

Once intrusive surveys have commenced, operations may continue at night or during poor visibility, as continuous activity is considered less disruptive than repeated start-ups.

3.2.1.4. Conclusion

The proposed surveys will generate underwater noise and vibration that could result in temporary behavioural disturbance to qualifying interest species, particularly marine mammals. While these effects are anticipated to be localised, temporary, and reversible, they cannot be excluded in the absence of mitigation. Implementation of the prescribed measures, including marine mammal mitigation protocols, vessel speed restrictions, and soft-start procedures, will ensure that the risk of significant adverse effects is minimised. With these controls in place, the activities are not expected to result in permanent or population-level impacts on any Qualifying Interests of nearby European Sites.

Accordingly, it is concluded that, following mitigation, noise and vibration arising from the proposed Project will not adversely affect the integrity of the SACs and SPAs within the Zone of Influence (ZoI), either alone or in-combination with other plans or projects, in view of their conservation objectives.

3.2.2. Potential Impact Mechanism 2 – Physical Disturbance

The proposed survey operations, including up to 20 boreholes positioned along the outfall corridor and drilled using a jack-up barge equipped with soil and rotary drilling rigs, as well as up to 10 Cone Penetration Tests (CPTs) conducted from jack-up barges or floating platforms, 15 vibrocores deployed from floating vessels, and up to 20 seabed sediment grabs, have the potential to cause physical disturbance to the marine environment. This disturbance results from the direct removal or alteration of seabed sediments, which can lead to temporary habitat loss or modification, and from increased turbidity due to sediment resuspension during drilling and sampling activities. Specific intertidal investigations such as trial pits and dynamic probing in the Cregg Beach landfall area, using mini-excavators and tracked mini rigs, will similarly cause localised physical disturbance.

Such physical impacts may affect benthic communities, particularly in areas supporting sensitive or slow-recovering species. While these effects are generally localised and temporary, their potential to impact the conservation objectives of nearby European Sites must be carefully assessed, especially where qualifying habitats or species are located within or adjacent to the expected zone of influence of the proposed surveys.

In addition to direct seabed disturbance, the operation of project vessels—ranging from 10 to 30 meters in length depending on equipment type—may cause additional physical disturbance to marine fauna. Increased vessel traffic in and around the survey areas could lead to temporary displacement of sensitive species such as marine mammals and waterbirds from critical foraging or resting habitats. Vessel movements may also elevate the risk of collision with large marine fauna, including basking sharks, seals, and cetaceans. Although such disturbance is expected to be temporary and reversible post-operations, it remains a key impact pathway to consider, particularly where vessel activity occurs near ecologically important locations.

3.2.2.1. Potential Receptors

Species – Habitats Directive (Annex II)

- Harbour porpoise (*Phocoena phocoena*) [1351] - sensitive to physical disturbance and collision in their foraging areas.
- Bottlenose dolphin (*Tursiops truncatus*) [1349] – risk from ingestion of contaminated prey or exposure in foraging areas, sensitive to physical disturbance and noise and vibration changes in their foraging areas.

3.2.2.2. Impact Assessment

Impacts to Annex I habitats and SCI species as a result of physical disturbance have already been screened out at Stage 1.

For marine mammals, physical disturbance may occur in the form of short-term behavioural responses to vessel presence and movement, including brief avoidance or altered surfacing patterns. These responses are well documented in coastal cetaceans and represent normal behavioural plasticity rather than significant ecological disturbance. Given the limited number of vessels involved, their slow operational speeds, the short duration of geotechnical activities at each sampling station and the small overall project footprint, any such behavioural reactions will be localised, transient and non-injurious. There is no pathway by which temporary marine mammal avoidance of survey vessels could lead to reduced foraging success, displacement from preferred habitats or population-level effects. Collision risk with large marine fauna is inherently low due to the limited vessel speeds and predictable movement patterns of jack-up barges and survey vessels.

Although not required to avoid significant effects, best-practice environmental measures, such as adopting careful equipment handling procedures, minimising unnecessary seabed contact, and maintaining appropriate vessel speed and manoeuvring protocols, will be routinely implemented. These measures further reduce the already low magnitude of disturbance.

Based on the limited spatial extent, short duration and highly reversible nature of physical disturbance from both intrusive sampling and vessel activity, there is no mechanism by which these effects could undermine the structure, function or Conservation Objectives of any Natura 2000 site.

3.2.2.3. Mitigation Measures

No specific mitigation is required to avoid significant effects arising from physical disturbance, as the characteristics of the surveys inherently limit effects to small, localised and transient interactions with the seabed and marine fauna. Best-practice construction and operational measures will nonetheless be adhered to throughout the survey programme as part of standard environmental management.

3.2.2.4. Conclusion

For the two mobile qualifying interests carried forward for further assessment harbour porpoise and bottlenose dolphin, physical disturbance may give rise to brief avoidance behaviour in the immediate vicinity of vessels or sampling equipment. Any such behavioural responses would be transient, non-injurious and of insufficient magnitude to influence foraging efficiency, habitat use, or the spatial distribution of either species within the SACs they are designated for. No measurable change to water quality, prey availability or ecological conditions relevant to these qualifying interests is predicted.

Although physical disturbance was carried forward to Stage 2 on a precautionary basis, the assessment confirms that the magnitude and extent of these effects are insufficient to undermine the conservation objectives of any European site, and no specific mitigation is required

3.3. Summary of Mitigation Measures

Mitigation measures have been developed to ensure that the proposed site investigation surveys will not result in adverse effects on the integrity of any European site, with reference to the Site-Specific Conservation Objectives. These measures are based on the outcomes of the screening and impact assessment within the zone of influence and best practice guidance for marine projects in Ireland and the EU.

Marine Mammals (Annex II Species)

- Appoint a suitably qualified MMO for the duration of the activities who will conduct a 30-minute pre-start watch within 500 m of operational vessels; delay start-up if dolphins or seals are observed until animals have cleared or a 30-minute clearance period has elapsed.
- Utilise a “soft start” or “ramp-up” procedure to gradually introduce underwater sound, allowing fauna to vacate the area.
- If works are paused for more than 30 minutes, repeat pre-start monitoring before recommencing.
- Establish clear communication protocols between MMO and site management for initiation and resumption of works.

3.4. Plans or Projects that might act in-combination

As outlined in **Section 2.6.1**, the Clare County Development Plan 2023–2029, supporting local growth in Ennistymon and Lahinch, informs the proposed surveys, which underpin the design of new wastewater treatment facilities aligned with sustainable expansion policies. Nearby small-scale, time-limited Coastal Walk upgrades are environmentally safeguarded and scheduled to avoid sensitive periods, posing no likely significant cumulative effects with the surveys.

Consultation confirms no active or proposed aquaculture licenses within or near the survey zones. Ongoing biodiversity projects in Liscannor Bay aim to enhance understanding of local marine species. The area experiences low levels of recreational boating and no regular commercial marine traffic, minimising navigational disturbance risk in combination with project activities.

Existing nutrient enrichment predominantly stems from agricultural runoff and current wastewater discharges; the temporary, localised nature of surveys precludes meaningful exacerbation of water quality pressures.

Strict adherence to pollution prevention, invasive species control, and contamination minimisation protocols throughout survey operations will prevent realistic pathways for cumulative or in-combination effects. Consequently, no likely significant in-combination effects on the conservation objectives of the Inagh River and Estuary SAC or the Cliffs of Moher SPA are anticipated.

3.5. Natura Impact Statement Conclusion

This report has been prepared with regard to the relevant provisions of the EU Council Directive 92/43/EEC and Ireland's EU (Birds and Natural Habitats) Regulations 2011 (as amended). This NIS has been prepared as it was not possible in the Screening for AA to rule out, as a matter of scientific certainty, that the proposed operation at the Project site will not have a likely significant effect on SACs and SPAs. The NIS has examined and analysed, in light of the best scientific knowledge, how the proposed operations could impact on the QIs of SACs and SCIs of SPAs, *i.e.,* conservation features and whether the predicted impacts would adversely affect the integrity of protected sites.

Mitigation measures have been identified which ensure that any impacts on the Conservation Objectives of conservation features for which SACs and SPAs are designated will be avoided so that there will be no risk of adverse effects to the protected sites.

It has been objectively concluded following an evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed operations together with the mitigation measures proposed, that the proposed operations will not pose a risk of adversely affecting (either directly or indirectly) the integrity of SACs or SPAs, either alone or in combination with other plans and projects, and that there is no reasonable scientific doubt in relation to this conclusion.

4. References

Bailey, M. and Rochford J. (2006) Otter Survey of Ireland 2004/2005. Irish Wildlife Manuals, No. 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Berrow, S., Whooley, P., O'Connell, M., & Wall, D. (2010). Irish cetacean review (2000-2009). *Irish Whale and Dolphin Group, 60pp*.

Blázquez, M., Baker, I., O'Brien, J. M., & Berrow, S. D. (2020). Population viability analysis and comparison of two monitoring strategies for bottlenose dolphins (Tursiops truncatus) in the Shannon Estuary, Ireland, to inform management. *Aquatic Mammals*, *46*(3).

Bowen, D. (2016). Halichoerus grypus. *The IUCN Red List of Threatened Species 2016*, e.T9660A45226042**.**

Braulik, G., Kasuga, M., & Majubwa, G. (2020). Local ecological knowledge demonstrates shifting baselines and the large-scale decline of sawfishes (Pristidae) in Tanzania. *African Journal of Marine Science*, *42*(1), 67-79.

CIEEM. (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. *Chartered Institute of Ecology and Environmental Management, Winchester.*

Clausen, K. K., & Bregnballe, T. (2022). Mapping important roost sites for waders to alleviate human-waterbird conflicts in the Danish Wadden Sea. *Ocean & Coastal Management*, *223*, 106147.

Colhoun, K., Rooney, E., Collins, J., Keogh, N.P., Lauder, A, Heardman, C. & Cummins, S. (2024). The Status and Distribution of Chough in Ireland: Results of the National Survey 2021. *Irish Wildlife Manuals, No. 151*. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

DEHLG. (2009). Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (Revised February 2010).

Dias, M. P., Granadeiro, J. P., Lecoq, M., Santos, C. D., & Palmeirim, J. M. (2006). Distance to high-tide roosts constrains the use of foraging areas by dunlins: implications for the management of estuarine wetlands. *Biological Conservation*, *131*(3), 446-452.

European Commission. (2007). EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission.

European Union. (1992). Habitats Directive: Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

Environmental Protection Agency. (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR). May 2022.

Environmental Protection Agency. (2018). Shannon North Estuary Catchment Assessment 2010 - 2015 (HA 27). epacatchments.

European Union. (1992). Habitats Directive: Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

Fuller, R. (2003) Factors influencing foraging decisions in ruddy turnstones (*Arenaria interpres*). Durham theses, Durham University.

Goodship, N. M., & Furness, R. W. (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. *Nature Scot Research Report*, *1283*.

Gutleb, A. C., Kranz, A., Nechay, G., & Toman, A. (1998). Heavy metal concentrations in livers and kidneys of the otter (Lutra lutra) from Central Europe. *Bulletin of environmental contamination and toxicology*, *60*(2), 273-279.

Lemarchand, C., Rosoux, R., & Berny, P. (2011). Ecotoxicology of the Eurasian otter (Lutra lutra) along Loire River (France) and predictable trends due to global change. In *Proceedings of XIth International Otter Colloquium* (pp. 5-14).

Leppäkoski, E., Gollasch, S., Gruszka, P., Ojaveer, H., Olenin, S., & Panov, V. (2002). The Baltic a sea of invaders. *Canadian Journal of Fisheries and Aquatic Sciences*, *59*(7), 1175-1188.

Loy, A., Kranz, A., Oleynikov, A., Roos, A., Savage, M., & Duplaix, N. (2022). Lutra lutra (amended version of 2021 assessment). *The IUCN red list of threatened species*, *2022*.

Lowry, L. (2016). Phoca vitulina. *The IUCN Red List of Threatened Species 2016*, e.T17013A45229114.

National Roads Authority. (2009). Guidelines for Assessment of Ecological Impact of Road Schemes.

OPR (2021). Practice Note PN01 Appropriate Assessment Screening for Development Management.

O'Brien, C. M. (2009). Phonation Production and Synchrony in the Bottlenose Dolphin (*Tursiops truncatus*).

Ó Cadhla, O., Strong, D., O'Keeffe, C., Coleman, M., Cronin, M., Duck, C., Murray, T., Dower, P., Nairn, R., Murphy, P., Smiddy, P., Saich, C., Lyons, D., Hiby, A.R. (2007). An assessment of the breeding population of grey seals in the Republic of Ireland, 2005. Irish Wildlife Manuals No. 34. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Reid, N., Thompson, D., Hayden, B., Marnell, F., & Montgomery, W. I. (2013)a. Review and quantitative meta-analysis of diet suggests the Eurasian otter (Lutra lutra) is likely to be a poor bioindicator. *Ecological indicators*, *26*, 5-13.

Richardson, W. J., Greene, C. R., Malme, C. I., and Thomson, D. H. (1995). Marine Mammals and Noise. *San Diego, CA: Academic Press, Inc*. 576pp.

Robertson, A., Jarvis, A. M., & Day, K. R. (1995, June). Habitat selection and foraging behaviour of breeding Choughs *Pyrrhocorax pyrrhocorax* L. in county Donegal. In *Biology and Environment: Proceedings of the Royal Irish Academy* (pp. 69-74). Royal Irish Academy.

Rogan, E., Garagouni, M., Nykänen, M., Whitaker, A., & Ingram, S. (2018). *Bottlenose dolphin survey in the Lower River Shannon SAC, 2018* (Report to the National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, University College Cork) (19 pages).

Southall, B. L., Bowles, A. E., Ellison, W. T., Finneran, J. J., Gentry, R. L., Greene, C. R. Jr., Kastak, D., Ketten, D. R., Miller, J. H., Nachtigall, P. E., Richardson, W. J., Thomas, J. A., & Tyack, P. L. (2008). Marine mammal noise exposure criteria: Initial scientific recommendations. *Aquatic Mammals, 33*(4), 411–521.

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

Voigt, M. B., Hackenbroich, C., Krüger, H. H., Liebau, A., & Esser, K. H. (2019). The in-air auditory thresholds of the Eurasian otter (Lutra lutra, L. 1758) as determined by auditory brainstem responses. *Hearing Research, 381*, Article 107774.

Wall, D. (2013). Marine Mammals and Megafauna in Irish Waters-Behaviour, Distribution and Habitat Use-WP1 Monitoring Spatial and Temporal Habitat Use and Abundance of Cetaceans.

Wells, R. S. (2019). Common bottlenose dolphin foraging: behavioral solutions that incorporate habitat features and social associates. In *Ethology and behavioral ecology of odontocetes* (pp. 331-344). Cham: Springer International Publishing.

Wright, A. J., Soto, N. A., Baldwin, A. L., Bateson, M., Beale, C. M., Clark, C., Deak, T., Edwards, E. F., Fernández, A., Godinho, A., Hatch, L. T., Kakuschke, A., Lusseau, D., Martineau, D., Romero, L. M., Weilgart, L. S., Wintle, B. A., Notarbartolo-di-Sciara, G., Martín, V. (2007). Anthropogenic Noise as a Stressor in Animals: A Multidisciplinary Perspective. *Journal of Comparative Psychology*, *20, 250-273*.

Endnotes

[1]Article 17 – Council Directive 92/43/EEC (Habitats Directive), latest national reporting cycle (2025) https://eur-lex.europa.eu/eli/dir/1992/43/2013-07-01/eng#art17
NPWS 2025 Conservation Status Assessment Reports for Habitats and Species under Article 17 https://www.npws.ie/publications/article-17-reports (Accessed [insert date])

[2] All site synopsis and respective conservation objectives documents can be assessed at Protected Sites in Ireland | National Parks & Wildlife Service (npws.ie)

[3] TIN126
[4]TIN128
[5] TIN123
[6] TIN124
[7] TIN125
[8] TIN140
[9] TIN137
[10] TIN139
[11] NPWS 1355 *Lutra lutra* Conservation Status Assessment Report.https://www.npws.ie/sites/default/files/general/otter-conservation-status-report.pdf (Accessed 21/08/2025)
[12] EIA Portal
[13] Clare County Council planning applications
[14] An Coimisiún Pleanala
[15] DAFM Aquaculture Viewer Interactive Map
[16] Marine Atlas Interactive Map
[17] MARA Maritime Usage Licence Applications
[18] Building a Marine Strategic Alliance in County Clare