GDG
GAVIN & DOHERTY
GEOSOLUTIONS

Allod Energy Ltd Maritime Usage Licence Application for Geophysical Marine Site Investigation Activities Supporting Information for Screening for Appropriate Assessment

Allód HYDROGEN STORAGE

Client	**Allod Energy Ltd**
Document Ref.	24084-REP-002-01
Project Title	Allód Geophysical Marine SI Activities
Date	17/09/2024

Project Title:	Allód Geophysical Marine SI Activities
Report Title:	Allod Energy Ltd Maritime Usage Licence Application for Geophysical Marine Site Investigation Activities Supporting Information for Screening for Appropriate Assessment
Document Reference:	24084-REP-002-01

Client:	Allod Energy Ltd
Ultimate Client:	Allod Energy Ltd
Confidentiality	Non Confidential

REVISION HISTORY

Rev	Date	Reason for Issue	Originator	Checker	Reviewer	Approver
00	[redacted]					
01						

DISCLAIMER

Gavin & Doherty Geosolutions Ltd. (GDG) has prepared this report for the sole use of Allod Energy Ltd (hereafter the "Client") in accordance with the terms of a contract between the Client and GDG. No other warranty, express or implied, is made as to the professional advice contained in the report or any other services provided by GDG. GDG does not accept any liability for the use of or reliance upon this report by any third party without our prior and express written agreement. GDG assumes no liability or duty of care to any third party in respect of or arising out of or in connection with this report and/or the professional advice contained within.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

List of Abbreviations

AA	Appropriate Assessment
AIMU	Assessment of Impact on the Maritime Usage
AIS	Automatic Identification System
BIM	Bord Iascaigh Mhara
BSF	Below Seafloor
CESS	Cumulative Effects Spatial Scope
CETS	Cumulative Effects Temporal Scope
CPOD	Continuous Porpoise Detectors
CO	Conservation Objective
COMREG	Commission for Communications Regulation
DAFM	Department of Agriculture, Food, and the Marine
DAHG	Department of Arts, Heritage and the Gaeltacht
DCCAE	Department of Communications, Climate Action & Environment
DHLGH	Department of Housing, Local Government and Heritage
EC	European Commission
EDR	Effective Deterrence Range
EEZ	Exclusive Economic Zone
EIAR	Environmental Impact Assessment Report
EMODnet	The European Marine Observation and Data Network
EPA	Environmental Protection Agency
EPS	European Protected Species
EU	European Union
FCS	Favourable Conservation Status
FLO	Fisheries Liaison Officer
GDG	Gavin and Doherty Geosolutions Ltd.
GSI	Geological Survey of Ireland
IMO	International Maritime Organization
INFOMAR	Integrated Mapping for the Sustainable Development of Ireland's Marine Resource
IROPI	Imperative Reasons of Overriding Public Interest
ISO	International Organization for Standardization
ITM	Irish Transverse Mercator
IWDDS	Interactive Web Data Delivery System
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effects
MAP	Maritime Area Planning
MARPOL	The International Convention for the Prevention of Pollution from Ships
MBES	Multibeam Echosounder
MI	Marine Institute
MAP	Maritime Area Planning Act 2021
MARA	Maritime Area Regulatory Authority

MU	Management Unit
MUL	Maritime Usage Licence
NIS	Natura Impact Statement
NM	Nautical Mile
NMS	National Monuments Database
NPWS	National Parks and Wildlife Service
NRW	Natural Resources Wales
OPR	Office for Planning Regulation
OWF	Offshore Wind Farm
PTS	Permanent Threshold Shift
QI	Qualifying Interests
SAC	Special Areas of Conservation
SBP	Sub Bottom Profiler
SCI	Special Conservation Interest
SPA	Special Protection Areas
SPL	Sound Pressure Level
SPR	Source Pathway Receptor
SSS	Side Scan Sonar
TTS	Temporary Threshold Shift
UK	United Kingdom
USBL	Ultra -Short Baseline
ZOI	Zone of Influence

Glossary of Terms

3D Seismic Survey	A 3D (three-dimensional) seismic survey provides a detailed three-dimensional image of the subsurface. 3D surveys use a grid of closely spaced seismic lines with multiple receivers spread over a large area. This dense coverage allows for the collection of seismic data in multiple directions, which is then processed to create a detailed 3D volume of the subsurface. The resulting data gives a clear and accurate picture of the geological formations, including the shape and size of the subsurface features.
Appropriate Assessment (AA)	An Appropriate Assessment (AA) is an assessment of the potential adverse effects of a plan or project (in combination with other plans or projects) on Special Areas of Conservation and Special Protection Areas. These Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are protected by both National and European Law.
Site Investigation Area	Area where site investigations will take place to determine the presence of halite rock formations within the survey licence area.
Benthic Ecology	Benthic ecology is the study of organisms that make up bottom communities (sediments, seagrass communities and rock outcrops) in lakes, streams, estuaries and oceans, to determine environmental health and conduct environmental appraisals.
Ecology	Ecology is a branch of biology concerning the spatial and temporal patterns of the distribution and abundance of organisms, including the causes and consequences.
Environmental Receptors	Environmental receptors are any organism, habitat or natural resource which could be adversely affected by an activity.
Estuaries	Estuaries are coastal inlets with a significant freshwater influence. They are diverse, dynamic habitats that help maintain the health of coastal ecosystems. They are a significant resource for bird and mammal species for feeding, breeding, and resting, and depending on their geomorphology and hydrology support a mosaic of other habitats, including Annex I habitats such as mudflats.
Favourable Conservation Status	The EU Habitats Directive requires EU Member States to achieve FCS of natural habitats and species, defined with respect to species by Article 1 (i) of the Directive as below: “conservation status will be taken as ‘favourable’ when: population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.”
Geophysical Surveys	Geophysical surveys are physical sensing techniques that produce a detail image or map of an area.

Geotechnical investigation and evaluation	Geotechnical investigation and evaluation include methods to acquire and evaluate subsurface information, including coring and sampling, laboratory testing, cone penetration testing, and pressure meter testing.
Habitats Directive	Adopted in 1992, the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. It forms the cornerstone of Europe's nature conservation policy with the Birds Directive and establishes the EU wide Natura 2000 ecological network of protected areas, safeguarded against potentially damaging developments.
Magnetometer	A magnetometer is a device that measures magnetism—the direction, strength, or relative change of a magnetic field at a particular location.
Maritime Usage Licence Area	Within this report: The areas within the outer limit of the State's continental shelf and high-water mark for which a Maritime Usage Licence Application is submitted to MARA for a licence under the Maritime Area Planning Act 2021.
MARPOL	MARPOL is the main international convention aimed at the prevention of pollution from ships caused by operational or accidental causes. It was adopted at the International Maritime Organization (IMO) in 1973. The Protocol of 1978 was adopted in response to a number of tanker accidents in 1976–1977.
Metocean	Metocean conditions refer to the combined wind, wave, and climate conditions as found at a certain location. They are most often presented as statistics, including seasonal variations, scatter tables, wind roses and probability of exceedance.
Mudflats	Tidal mudflat habitat is comprised of the intertidal section of the coastline where muds dominate.
Multibeam Echosounder (MBES)	An echosounder uses sound waves to measure water depth. A transducer mounted under a vessel emits a pulse which travels through the water to the seafloor and bounces back to a receiver. The time it takes for the signal to return is measured, and because the speed of sound through water) is known, the water depth under the boat can be calculated. This is the basic principle of hydrography and seafloor mapping. A multibeam echosounder (MBES) measures multiple echoes at a time.
Natura Impact Statement	A Natura Impact Statement (NIS) is the statement prepared following Appropriate Assessment (AA) of Natura 2000 sites as required under the EU Habitats Directive which presents information on the assessment and the process of collating data on a project and its potential significant impacts on Natura 2000 site(s).
Pollution Event	A 'pollution incident' includes a leak, spill or escape of a substance, or circumstances in which this is likely to occur.
Receiving Environment	The receiving environment is the environment upon which a proposed activity might have effects.

Sandbanks	Sandbanks are distinct banks that arise from horizontal or sloping plains of sediment that ranges from gravel to fine sand. They are primarily composed of sandy sediments permanently covered by water, at depths of less than 20m below chart datum.
Sandflats	Tidal sandflat habitat is comprised of the intertidal section of the coastline where sands dominate.
Side Scan Sonar (SSS)	Side-scan uses a sonar device that emits conical or fan-shaped pulses down toward the seafloor across a wide-angle perpendicular to the path of the sensor through the water, which may be towed from a surface vessel or submarine or mounted on the ship's hull.
Special Areas of Conservation (SAC)	These are prime wildlife conservation areas considered to be important on a European as well as national level. The EU Habitats Directive lists certain habitats and species that must be protected within SACs.
Special Protection Areas (SPA)	Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate Special Protection Areas (SPAs) for the protection of: Listed rare and vulnerable species; regularly occurring migratory species and wetlands, especially those of international importance.
Sub-Bottom Profiler	A sub-bottom profiler is a type of sonar system that produces a 2-dimensional stratigraphic cross section by using acoustic energy to image very shallow sub-surface features in an aquatic environment.
Sea Cliffs	A sea cliff is a steep or vertical slope located on the coast, the base of which is in either the intertidal or subtidal zone. Hard cliffs, composed of hard rock such as basalt, are at least 5m high, while soft cliffs, composed of softer substrates such as shale or boulder clay, are at least 3m high.
Water Courses	Natural or artificial channels through which water flows.

EXECUTIVE SUMMARY

This report is submitted in support of the Maritime Usage Licence Application for the Allod Energy Ltd. geophysical marine site investigation activities and includes information in support of Stage 1 of the Appropriate Assessment (Screening for Appropriate Assessment (AA)) process as required under the Habitats Directive (92/43/EEC).

The report aims to support the Licence application process and provide the necessary information to the competent authorities to assist them in making an informed decision on the likely impact of the proposed activities on Special Areas of Conservation (SACs) and their designated Annex I habitats and Annex II species Qualifying Interests (QIs) and Special Protection Areas (SPAs) and their designated Special Conservation Interest (SCI) species.

51 no. SACs, 44 no. SPAs including the two candidate SPAs (the North-west Irish Sea cSPA and the Seas off Wexford cSPA) were considered for the potential for likely significant effects to arise via the identified source-receptor-pathways.

SACs assessed with Harbour Porpoise, Bottlenose Dolphin , Grey Seal and Common Seal Qualifying Interests which, due to their mobility, have the potential to be present within the Maritime Usage Licence Area, may have likely significant effects on their conservation objectives due to underwater noise produced by the proposed site investigation activities in the absence of mitigation measures, therefore these species and the relevant 51 no. SACs are **screened in for Stage 2 Appropriate Assessment.**

Ireland SACs

000101 Roaringwater Bay and Islands SAC

002158 Kenmare River SAC

000090 Glengarriff Harbour and Woodland SAC

000764 Hook Head SAC

000707 Saltee Islands SAC

002172 Blasket Islands SAC

002269 Carnsore Point SAC

002953 Blackwater Bank SAC

000781 Slaney River Valley SAC

002327 Belgica Mound Province SAC

003000 Rockabill to Dalkey Island SAC

000213 Inishmore Island SAC

003015 Codling Fault Zone SAC

000328 Slyne Head Islands SAC

000204 Lambay Island SAC

000278 Inishbofin and Inishark SAC

000495 Duvillaun Islands SAC

000507 Inishkea Islands SAC

002998 West Connacht Coast SAC

UK SACs

UK0013694	Isles of Scilly Complex
UK0030396	Bristol Channel Approaches / Dynesfeydd Môr Hafren
UK0013116	Pembrokeshire Marine/ Sir Benfro Forol
UK0013114	Lundy
UK0030397	West Wales Marine / Gorllewin Cymru Forol
UK0030398	North Anglesey Marine / Gogledd Môn Forol
UK0030399	North Channel

French SACs

FR5302015	Mers Celtiques - Talus du golfe de Gascogne
FR5302016	Récifs du talus du golfe de Gascogne
FR2502022	Nord Bretagne DH
FR5300018	Ouessant-Molène
FR5300017	Abers - Côte des légendes
FR5302007	Chaussée de Sein
FR5300015	Baie de Morlaix
FR5300009	Côte de Granit rose-Sept-Iles
FR5302006	Côtes de Crozon
FR5300010	Tregor Goëlo
FR2500084	Récifs et landes de la Hague
FR2502019	Anse de Vauville
FR5300011	Cap d'Erquy-Cap Fréhel
FR5300066	Baie de Saint-Brieuc - Est
FR2502018	Banc et récifs de Surtainville
FR5300012	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard

FR2500079 Chausey

FR2500085 Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire

FR5300061 Estuaire de la Rance

FR2500077 Baie du Mont Saint-Michel

FR2502020 Baie de Seine occidentale

FR2502021 Baie de Seine orientale

FR2300139 Littoral Cauchois

FR2200346 Estuaires et littoral picards (baies de Somme et d'Authie)

FR3100478 Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant

Further information regarding these sites will therefore be provided within a Natura Impact Statement (NIS), to support Stage 2 AA, i.e. Natura Impact Statement (NIS).

1 INTRODUCTION

Allod Energy Ltd has prepared this report in support of an application for a Maritime Usage Licence under the Maritime Area Planning Act (2021) to undertake geophysical marine site investigation activities, with the objective of assessing an area in the Celtic Sea for potential hydrogen storage. The proposed investigations look to define the extent and internal character of halite rock beneath the seafloor, to assess and de-risk potential suitability for hydrogen storage development in halite.

The Licence Application Area (outlined in red, see Figure 1-1) comprises the proposed indicative survey area, which includes the anticipated turning circle of the vessels and the length and width of any streamers which may be used. The distance from the indicative survey area to the nearest landfall is 65 km. The total Licence Application Area covers 1481.00 km^2 (148100 ha).

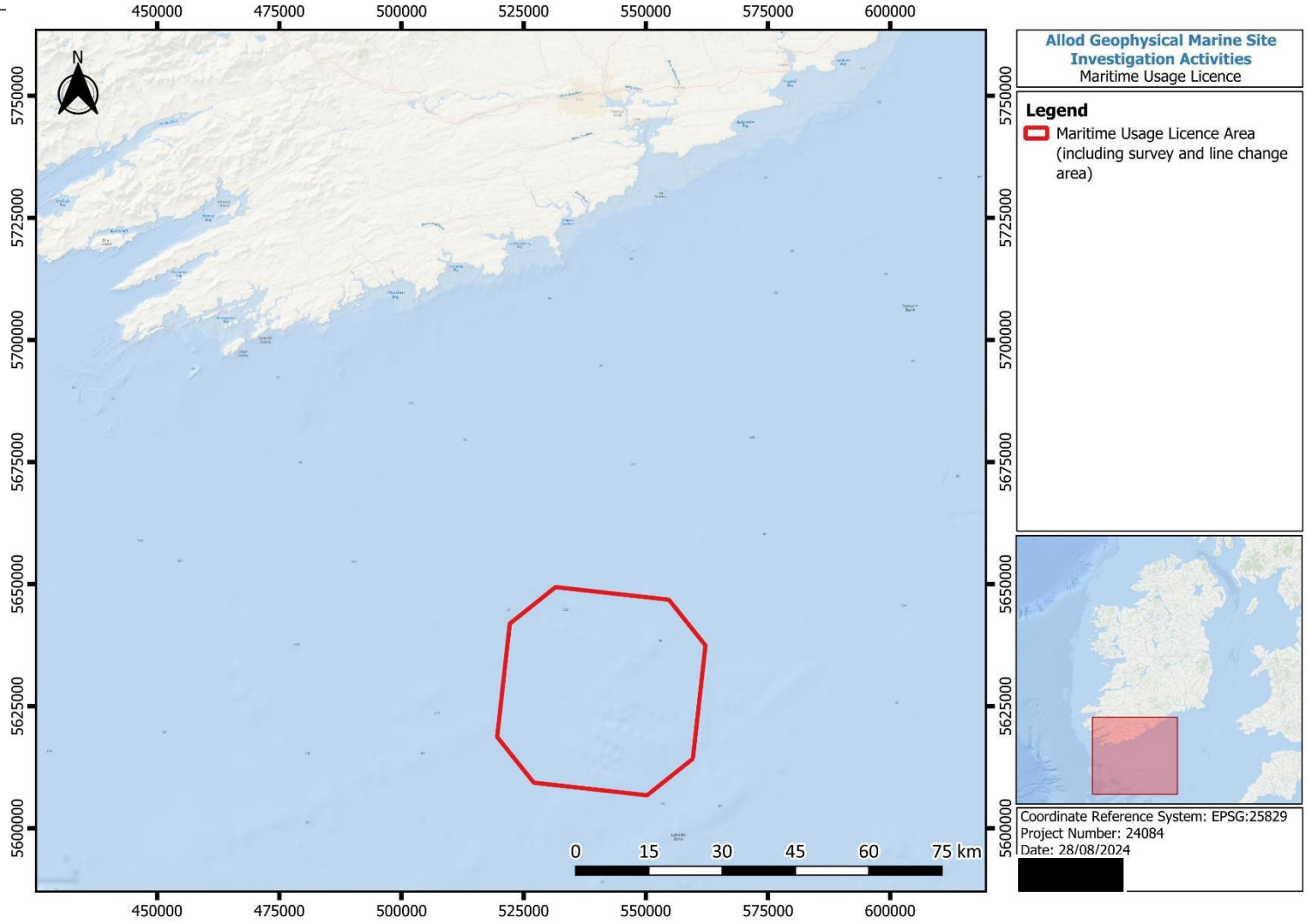

Figure 1-1 Allód Maritime Usage Licence Area (solid red boundary)

1.1 AIM OF THIS REPORT

This report is part of the Maritime Usage Licence (MUL) application to the Maritime Area Regulatory Authority (MARA) and aims to provide information documenting the current state of the environment within the proposed Licence Area and surrounds of the proposed site investigation activities and on the potential effects from the proposed activities on the receiving environment. This report includes information in support of Stage 1 of the Appropriate Assessment (Screening for Appropriate Assessment) process as required under the Habitats Directive (92/43/EEC).

This report aims to support the Licence application process and provide the necessary information to the competent authorities to assist them in making an informed decision on the likely impact of this project on Special Areas of Conservation (SACs) and their designated Annex I habitats and Annex II species Qualifying Interests (QIs), and Special Protection Areas (SPAs) and their designated Special Conservation Interests (SCIs). The process of AA Screening is a determination as to whether:

- the Proposed Activities are directly connected to and necessary to the management of sites as European Sites; and
- in view of best scientific knowledge and in view of the conservation objectives of any European Site, the Proposed Activities, individually or in combination with other plans or projects, are likely to have significant effect on European Sites.

If it is concluded that significant effects are likely, these effects are examined further in the Natura Impact Assessment (NIS) that also accompanies this MUL Application.

1.2 STRUCTURE OF THE REPORT

This report is structured into the following chapters to include information relating to the AA process, proposed activities and potential impacts, and the receiving environment, including relevant Natura 2000 sites and features. Specifically, the chapters of this report are as follows:

- Executive Summary
- Chapter 1: Introduction (This chapter)
- Chapter 2: Habitats Directive (92/43/EEC) (outlines key aspects of the AA process)
- Chapter 3: Identification of potential environmental impacts and effects of proposed site investigation activities
- Chapter 4: Screening for Appropriate Assessment - Identification of relevant European Sites within Zone of Influence of works (using Source-Pathway-Receptor approach) and Assessment of Likely Significant Effects
- Chapter 5: (Stage 1) Screening Determination Statement
- Chapter 6: Screening Statement Outcome

1.3 LICENCE AREA

This document has been prepared in support of a MUL Application, which seeks the consent to conduct geophysical marine site investigations to assess the suitability of the Celtic Sea for potential hydrogen storage. The investigations look to define the extent and internal character of halite rock beneath the seafloor in an effort to assess and de-risk potential suitability for hydrogen storage development in halite.

The Licence Area covers a total area of 1481 km^2 and is comprised of the proposed Indicative Survey Area, which considers the length and width of streamers which may be used, and the turning circle of the vessels which are expected to be used (Figure 1-1).

1.4 GEOPHYSICAL MARINE SITE INVESTIGATION ACTIVITIES

The objective of the proposed Allód geophysical marine site investigation activities is to determine environmental conditions, and the seafloor and subsurface geological characteristics within the Licence Area. It is proposed to undertake 2D geophysical and 3D seismic geophysical investigation activities to assess an area in the Celtic Sea for potential hydrogen storage. 2D geophysical surveys provide a broad, cross-sectional view of the subsurface that is useful for detailed assessment of the shallow subsurface, while 3D seismic surveys offer a detailed, volumetric image of the geological formations at depth, including the shape and size of the subsurface features that is critical for accurate resource assessment and development planning. The investigations look to assess the extent and internal character of halite beneath the seafloor to de-risk any future hydrogen storge development.

The proposed programme of site investigations to be undertaken within the MUL area is described in detail in the Programme of Works section of the Assessment of Impacts on the Maritime Usage (AIMU) document accompanying this Application (document reference number: 24084-REP-001-00 MUL AIMU). The exact technical specifications of the equipment to be used will not be known until the survey contracts have been awarded. However, a description of typical equipment and expected survey parameters is provided in the Programme of Works section of the AIMU.

The proposed site investigations will involve the imaging of halite rock in the indicative survey area by means of geophysical surveying. All site investigation activities will be undertaken within the MUL area co-ordinates shown in Figure 2-2 of the AIMU document.

All possible efforts will be made to follow survey recommendations outlined in the

- Guidance to Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters. Prepared by National Parks and Wildlife Service, DAHG (2014).

The proposed surveys will involve the using various geophysical equipment in order to collect data about seabed and subseafloor features. The proposed surveys will involve a 15m x 15m array of up to 40 small airguns with a combined volumetric capacity of c. 4500 cu.in. The airgun array will emit air bubbles which make sound when they pop, thus generating sound suitable for collecting data about the seabed and seafloor features. The sound returned from the seabed and subseafloor is recorded by a series of hydrophones encased within steamers which are towed behind the airgun array. The survey is anticipated to utilise 10 steamers, each 8 km in length, with a 100m spacing between each

streamer, giving a total width of 1 km and total length of 8 km, totalling over 10,000 hydrophones which continuously record sound.

In addition to these streamers, a potential complementary site investigation activity could be remote sensing activities, whereby there may be up to 500 ocean bottom nodes (OBNs) on the seabed to receive the seismic energy transmitted to the seafloor from the rocks below. If deployed, the OBN's will be placed on the seafloor at predetermined locations using an ROV and will remain on the seabed whilst the source vessel sails a predetermined survey pattern shooting the sound source which in this case will be the airguns. The OBN's are advanced hydrophones that record the sound returned from the subseafloor. They are beneficial to use as they isolate the receiver from sea surface noise (weather) and allow the measurement of shear waves.

This MUL application is a consent to conduct site investigation activities and should not be confused with a Maritime Area Consent (MAC) application for a development consent, which will be subject to the Maritime Area Planning Act 2021 (MAPA) and the Planning and Development Act, 2000-2021. This is not a MAC application for a development.

1.5 SURVEY SCHEDULE

The intention is to begin survey activities as soon as practicable following license award, allowing for a tender process, vessel availability and anticipated suitable weather conditions (April to September), survey activities are anticipated to take 20 days, excluding any operational downtime. It is the intent to acquire all data within a single survey campaign, which is planned to last for a short period of approximately 3 weeks; however, weather or vessel and equipment availability may dictate a staged programme of surveying over the licence duration. The approximate durations of each of the survey activities are provided in Table 2-3 in Section 2.2 of the AIMU (report number 24084-REP-001-00) document accompanying this application. The exact mobilisation dates for the survey will not be known until the process of procuring survey contractors is complete, these investigations will be subject to vessel and contractor availability and in anticipation of delays with some of these elements, Allód are requesting a 7-year survey licence to allow for some of these unpredictable delays.

Timing of the site investigation activities is dependent on many factors including weather, availability of vessels and the grant of a licence but is anticipated to be within the months of April to September. The granting of a licence will have a direct effect on the timing of site investigation activities; therefore, two theoretical survey schedules (see Table 1-1) are presented to support the MUL Application.

Table 1-1 Proposed survey schedules (ideal and licence timing/weather impacted scenarios) to carry out geophysical marine site investigations in the Celtic Sea

Schedule 1 – Ideal Scenario	
November 2024	MUL granted
December 2024	Tender process

January 2025	Contractor Award
May 2025	Vessel mobilised
June 2025	Vessel demobilised; data acquisition complete
June 2026	3D data processing complete, ready for evaluation
August 2026	Commencement of desktop data evaluation
August 2027	Assessment/Desk studies complete
Survey Schedule 2 – Licence Timing/Weather Impacted Scenario	
January 2025	MUL granted
February 2025	Judicial Review initiated
February 2025	Tender process
February 2026	Judicial Review finalised, MUL upheld
February 2026	Tender process
March 2026	Contractor Award
May 2027	Vessel mobilised (in the event of no availability in 2026)
June 2027	Vessel demobilised; data incomplete due to bad weather conditions
May 2028	Vessel re-mobilised for survey completion

June 2028	Vessel demobilised; data acquisition complete
June 2029	3D data processing complete
August 2029	Commencement of desktop data evaluation
December 2029	Unexpected hazards/anomalies/environmental constraints identified requiring further surveying
May 2030	Smaller survey targeting potential hazards/environmental assessments
December 2030	Additional data processing complete
December 2031	Assessment/Desk studies complete

2 HABITATS DIRECTIVE (92/43/EEC)

The purpose of this report is to inform the AA process as required under the Habitats Directive (92/43/EEC). The AA Screening informed by this information will help determine whether the proposed surveys, both alone and in combination/cumulatively with other planned activities under the remit of this project and others, are likely to have a significant effect on any Natura 2000 site or the qualifying interests. This document describes Stage 1 of the Appropriate Assessment process. For Stage 2 Natura Impact Statement (NIS) please see the accompanying Allod Energy Ltd MUL Application NIS document (document reference number: 24084-REP- MUL AIMU).

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

1. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010 revision)
2. Appropriate Assessment under Article 6 of the Habitats Directive; Guidance for Planning Authorities. Circular NPW 1/10 and PSSP 2/10
3. Guidance to Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters. Prepared by National Parks and Wildlife Service, DAHG (2014).
4. Guidelines for Good Practice: Appropriate Assessment of Plans under Article 6(3) Habitats Directive (International Workshop on Assessment of Plans under the Habitats Directive, 2011);
5. Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document. Prepared by National Parks and Wildlife Service, DAHG (2012).
6. Managing Natura 2000 Sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission - 21 November 2018)
7. Office of the Planning Regulator – Practice Note 01 – PN01 (March 2021)
8. The European Commission Guidance “Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, September 2021”.

2.1 LEGISLATIVE BACKGROUND

The Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna), which was adopted in 1992, transposed into Irish Law in 1997 and subsequently amended and consolidated, aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. It provides a framework for legal protection to ensure the conservation of a wide range of rare, threatened, or endemic animal and plant species throughout the European Union. The Birds Directive (Conservation of Wild Birds Directive (79/409/EEC) aims to protect all of the 500 wild bird species naturally occurring in the European Union. The Habitats Directive and Birds Directive form the cornerstone of Europe's nature conservation policy. Together they form a coherent network of protected areas (SACs and SPAs), called Natura 2000, safeguarded against potentially damaging developments.

The requirement for "Appropriate Assessment" is set out in Articles 6(3) and 6(4) of the Habitats Directive (92/43/EEC). If a project is likely to have a significant effect on a Natura 2000 site, either alone or in combination with other plans or projects, it must undergo an Appropriate Assessment (AA). According to Article 6(3) of the Habitats Directive:

“Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 site) but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the site's conservation objectives”.

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

Article 6(4) states: “If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for environment or, further to an opinion from the Commission to other imperative reasons of overriding public interest.”

This procedure is applied in Ireland through Irish Habitat Regulations (2011) (Statutory Instrument (S.I.) No. 477 of 2011.

2.2 THE APPROPRIATE ASSESSMENT PROCESS

The European Commission’s methodological guidance (EC, 2021) promotes a three-stage process to complete an AA and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The steps and procedures involved in completing each stage, as described in the guidance, are shown below (Figure 2-1).

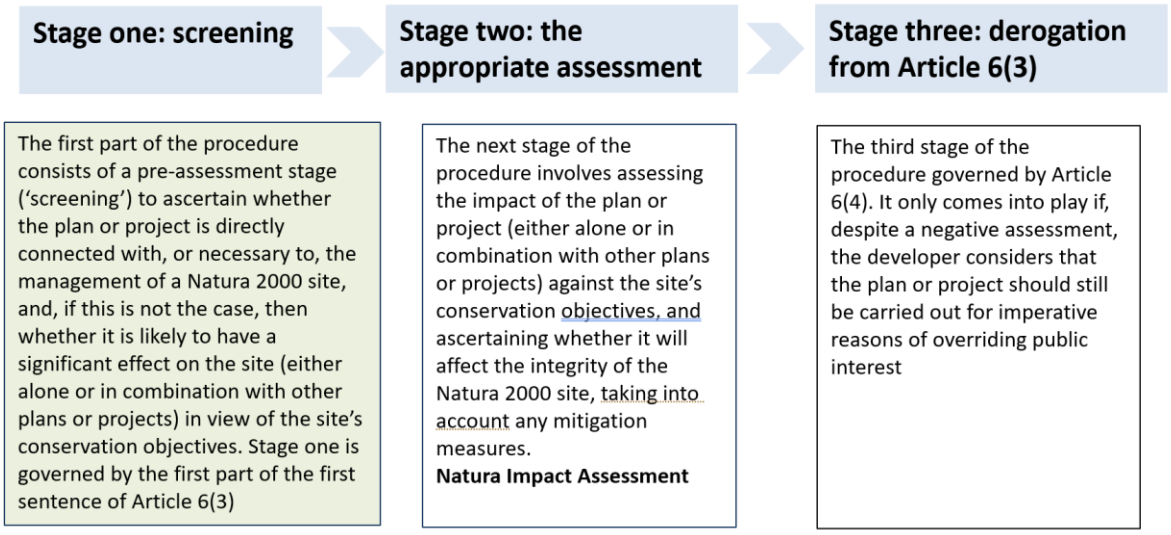

Figure 2-1: Stages in the AA process (Source: EC, 2021)

2.3 METHODOLOGY FOR THE PREPARATION OF THIS REPORT

This report includes information to support Stage 1 of the Appropriate Assessment process, as detailed in section 2.2 above, and has been prepared in accordance with the guidance numbered 1 to 7 in the first paragraphs of this section above.

As the proposed works are not directly connected to or necessary for the management of a Natura 2000 site, this report focuses on assessing whether the works, alone or cumulatively with other plans and projects, are likely to have significant effects on any Natura 2000 site in view of its conservation objectives.

This report has been informed by a review of publicly available datasets and available scientific literature that allowed the characterisation of the receiving environment and supported the identification and assessment of potential impacts and their significance. The sources of the information used are cited throughout the report and listed in the References section.

The examination, analysis and evaluation of the relevant information that supported the Appropriate Assessment process conducted and documented in this report followed the precautionary principle throughout.

The report content (and corresponding chapters) includes:

- Description of the proposed project (see chapter 1)
- Description of legislative background, of the Appropriate Assessment process and Methodology for the preparation of the report (this chapter)
- Identification and description of the potential direct and indirect effects on the Natura 2000 sites (see chapter 3)

- Identification of the relevant Natura 2000 sites and their Qualifying Interests (QIs)/Special Conservation Interests (SCIs), and their AA Screening (Stage 1) against the identified potential impacts (see chapter 4 and 5)
- Natura Impact Statement (Stage 2) is presented in the accompanying document 22032-REP-006-00 MUL NIS.

2.4 STATEMENT OF AUTHORITY

This report has been prepared by [redacted] (BSc. Hons Earth Science, MSc. Coastal and Marine Environments). [redacted] is an Environmental Scientist with experience in marine licence application preparation, Environmental Impact Assessment Scoping Report preparation and environmental mapping.

This report has been reviewed by [redacted] (BSc. (Hons) Marine Sciences). [redacted] is a Marine Ecologist and Ornithologist with experience in terrestrial, aquatic and marine/coastal ecology and is a trained Marine Mammal Observer (MMO). Her current work includes ecological and environmental desktop studies for terrestrial, aquatic and marine environments, specialised mammal surveys, ornithological surveys, and map preparation.

This report has been checked and approved by [redacted] (BSc. Hons Marine Science, MSc. Engineering in the Coastal Environment). [redacted] is a Marine Ecologist with coastal engineering expertise and extensive experience of offshore benthic survey and Marine Protected Area monitoring who has undertaken multiple environmental assessments under the Habitats Directive for GDG and as a statutory adviser to the UK government and its devolved administrations with the Joint Nature Conservation Committee.

3 IDENTIFICATION OF POTENTIAL ENVIRONMENTAL IMPACTS AND EFFECTS

3.1 OVERVIEW OF POTENTIAL EFFECTS FROM THE PROPOSED SITE INVESTIGATIONS

The potential direct and indirect environmental effects identified for appraisal are set out in Table 3-1 and described below, given the site investigation activities proposed (summarised in Section 1.4 and described in the Programme of Works within the AIMU).

Table 3-2 sets out the possible effects from the proposed site investigation activities considered relevant. The potential impacts may have direct and indirect effects on the marine environment, and these are discussed under the following Sections:

- Section 3.2 – Marine Ornithology
- Section 3.3 – Annex I Habitats
- Section 3.4 – Annex II Species

Table 3-1 Potential direct and indirect environmental pressures of activities identified for appraisal.

Aspects	Associated Pressures	Effect on Receptor(s)
Seabed disturbance from OBN deployment on seabed (i.e. nodes – if deployed)	Temporary habitat disturbance including penetration and abrasion	Physical disturbance to benthic habitats
	Smothering and siltation rate changes	Disturbance to benthic habitats and/or Mortality of sessile species
Generation of underwater noise during geophysical surveys	Underwater noise changes	Disturbance and displacement (physiological and behavioural responses)
Presence of vessel(s) and towed equipment	Collision above and below water with static or moving objects not naturally found in the marine environment	Mortality and/or Injury
	Visual and above water noise disturbance	Disturbance and displacement (physiological and behavioural responses)
Accidental events including pollution and littering	Hydrocarbon & polycyclic aromatic hydrocarbon (PAH) contamination	Mortality and/or Injury

Consideration of spatial and temporal footprint of Proposed Activities

The overall spatial and temporal scale of the Proposed Activities has been considered to identify the potential impacts and subsequent effects that may arise on Natura 2000 Sites. The MUL application area is 1,481 km^2 . The proposed surveys will involve using an airgun array of up to 40 small airguns with a volumetric capacity of c. 4500 cubic inches (cu.in) to collect data about seabed and subseafloor features. The sound returned from the seabed and subseafloor is recorded by a series of hydrophones encased within streamers which are towed behind the airgun array. The survey is anticipated to utilise 10 steamers, each 8 km in length, with a spacing between each streamer, giving a total width of 1 km and a total length of 8 km. This totals over 10,000 hydrophones which continuously record sound. In addition to these streamers, as a potential complementary site investigation activity, if deployed, there may be up to 500 ocean bottom nodes (OBN's) on the seabed. If deployed, the OBNs will be placed at predetermined locations using an ROV and will remain on the seabed whilst the survey vessel sails a predetermined survey pattern.

However, at any one time during the licence period, compared to the total MUL area, the proposed site investigation activities will occupy a smaller spatial footprint than the total MUL area. The majority of activities proposed will consist of towed geophysical survey equipment. Bottom contacting activities will occur only with Ocean Bottom Node (OBN) equipment deployment, if deployed.

Potential impacts will therefore be limited to a relatively small percentage of the entire application area at any given time. Deployed equipment such as the OBNs remain in situ for an approximate 20 days/3 week period of time.

As the proposed site investigations for this project are localised, transient in nature and of short duration this implies that:

There will be a negligible number of survey vessel(s) compared to the current marine traffic, which includes cargo ships, ferries, and fishing.

The parameters of the potential impacts in the context of the specific activities being applied for under this MUL application are examined in the following sections to identify if they should be considered under an Appropriate Assessment Stage 1 Screening.

3.2 MARINE ORNITHOLOGY

The following potential effects of the proposed SI activities on SCIs of SPAs, or the habitats that support SCIs, are considered in Table 3-2.

Table 3-2: Summary Potential Effects

Potential Effect	Description
Direct impact of disturbance and displacement from increased underwater noise	Vessel activity associated with survey activities; the deployment and retrieval of equipment (e.g. Ocean Bottom Nodes, if deployed), and geophysical surveys. Survey equipment associated with geophysical surveys.
Direct impact of disturbance and displacement from increased above-water noise	Vessel activity associated with survey activities (as listed above).
Direct impact from increased visual disturbance and displacement	Vessel activity associated with survey activities (as listed above).
Indirect effects through impacts on prey availability and prey acquisition	Underwater noise inducing activities within the MUL area (vessel noise and equipment from geophysical survey activities. Impacts to marine benthic communities and habitats from the deployment and placement of Ocean Bottom Nodes. Accidental events such as pollution or littering affecting prey species.
Mortality and/or injury	Accidental events such as pollution and littering during/from at sea refuelling and other vessel and survey activities.

3.2.1 DISTURBANCE AND DISPLACEMENT FROM SI ACTIVITIES AND VESSEL MOVEMENTS

Seabird species exhibit varying species-specific sensitivities to anthropogenic noise and behavioural responses can vary between seasons (i.e. inside and outside the breeding season), time of day, flock size and whether the seabird species is foraging or roosting (Cutts 2013*.,* Goss-Custard *et al*., 2019). Displacement can pose a potential ecological threat to seabirds as it can result in habitat loss (i.e. in the form of foraging and rafting areas). Responses depend on the context, magnitude and predictability of the noise source within the context of their surrounding environment. Depending on whether a species is adaptive or if a species is less adaptive or constrained (e.g. during the breeding season), disturbance and displacement of species may have consequences at individual and population levels (Joint SNCB Interim Displacement Advice Note, 2022, Pg. 2-3). Seabirds may also be indirectly affected through prey acquisition where, due to the site investigation activities, prey availability is reduced which may then adversely affect survival and productivity of the individual or at a population level.

Seabird foraging ranges vary between the breeding and wintering/migrating seasons). Birds in the breeding season are known to exhibit “central-place foraging”, where the forager brings their

captured items to a given location (Orians and Pearson (1979). The most obvious example of central place foragers is birds during the breeding season while rearing their chicks. Chick-rearing seabirds are more likely to alternate between chick-feeding foraging excursions and self-feeding foraging excursions when there are large differences between habitat quality near and far from the breeding site (Phillips, Guilford and Fayet, 2023). In addition, foraging range disparities can be seen between single-prey loaders and multi-prey loaders (i.e. bringing back one prey at a time to chicks or bring back several prey items to chicks, respectively).

In identifying potential SPAs for the AA Screening, the foraging ranges, taken from mean maximum foraging range distances outlined in Woodward *et al*. (2019), migration routes and distribution density maps from ObSERVE programme and associated papers, along with the specific seasons for the designated SCI species has been considered.

3.2.2 DISTURBANCE FROM UNDERWATER NOISE

Diving seabirds have an underwater hearing range of approximately 500Hz to 4kHz (Crowell 2014, Crowell et al. 2015, Hansen et al. 2017). McCauley (1994) inferred from vocalisation ranges that the threshold of perception for low frequency seismic noise in some species (e.g. penguins, considered as a proxy for auk species) could be high, hence individuals could be adversely affected near to a low frequency seismic noise source.

The diving bird species listed in Table 3-4 are known to engage in pursuit diving or benthic feeding in marine, coastal and estuarine waters at least during part of the year and as such may be vulnerable to underwater noise.

Table 3-3 Migratory and/or Annex I diving bird species considered potentially vulnerable to underwater noise

Migratory and/or Annex I diving bird species considered potentially vulnerable to underwater noise effects		
Divers and grebes	**Seabirds**	**Diving ducks**
Great northern diver (*Gavia immer)*	Manx shearwater *Puffinus puffinus*	Pochard *Aythya ferina*
Red-throated diver *(Gavia stellata)*	Gannet *Morus bassanus*	Tufted duck *Aythya fuligula*
Black-throated diver (*Gavia arctica)*	Cormorant *Phalacrocorax carbo carbo*	Scaup *Aythya marila*
Little grebe (*Tachybaptus ruficollis)*	Shag *Phalacrocorax aristotelis*	Eider *Somateria mollissima*
Great crested grebe (*Podiceps cristatus)*	Guillemot *Uria aalge*	Long-tailed duck *Clangula hyemalis*
Slavonian grebe (*Podiceps auritus)*	Razorbill *Alca torda*	Common scoter *Melanitta nigra*
	Puffin *Fratercula arctica*	Velvet scoter *Melanitta fusca*
		Goldeneye *Bucephala clangula*
		Red-breasted merganser *Mergus serrator*
		Goosander *Mergus merganser*

Very high amplitude low frequency underwater noise may result in acute trauma to diving seabirds, with several studies reporting mortality of diving birds in close proximity (i.e. tens of metres) to underwater explosions (Yelverton et al. 1973, Cooper 1982, Stemp 1985, Danil & St Leger 2011). The noise caused by explosions, which is impulsive in nature, would be many magnitudes greater than that produced by the activities proposed under this application.

Direct effects from underwater seismic surveys on diving birds could potentially occur through physical damage, given exposure to sufficiently high amplitudes, or through behavioural disturbance. Deeper-diving species which spend longer periods of time underwater (e.g. auks) may be most at risk of exposure, but all species which routinely submerge in pursuit of prey and benthic feeding opportunities in marine and estuarine habitats may be exposed to anthropogenic noise (BEIS, 2019). While changes in penguin abundance and distribution concurrent with seismic survey activity has been recorded by Pichegru et al. (2017), no significant difference was observed in abundance of thick-billed murre (Brünnich's guillemot), or fulmar or kittiwake in the Hudson Strait during shooting and non-shooting periods of seismic surveys undertaken over a three-year campaign (Stemp, 1985). Mortality of seabirds has not been reported during extensive seismic operations in the North Sea and elsewhere.

While seabird responses to approaching vessels are highly variable (e.g. Fleissbach *et. al*., 2019), flushing disturbance would be expected to displace most diving seabirds from close proximity to the survey vessel and any towed equipment, thereby limiting their exposure to the highest sound pressures generated.

Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeding, are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and low disturbance sensitivity.

Note, there is no route to impact between non-diving SCIs and underwater noise, as these species are not fully immersed in the water column when foraging. Likewise, diving seabirds whose predominant method of foraging is surface feeding, shallow diving and dip diving are considered unlikely to be affected by underwater noise as there is no route to impact or due to the brevity of exposure time and sensitivity to disturbance (Fleissbach *et al*., 2019).

3.2.3 DISTURBANCE AND DISPLACEMENT FROM ABOVE-WATER NOISE

The physical presence of vessels and airborne noise from the survey vessels and activities may cause displacement and/or other behavioural responses (including habituated responses) in birds, including during the breeding season. Seabirds and, more generally, wildfowl species, including foraging or roosting aggregations of dabbling ducks and geese, respond differently to visual disturbance depending on their activity, the species concerned and context to their stimulus (Cutts, *et al*., 2013).

3.2.4 DISTURBANCE AND DISPLACEMENT FROM VISUAL IMPACTS

Sea birds vary in their responses and susceptibilities to visual disturbances and displacement. This is discussed in further detail below where relevant bird species are screened in (see Section 4.2).

While rafting birds which are Qualifying Interests of SPAs within foraging range of the MUL application area may move in response to vessels in transit, such effects are of low magnitude and short duration and will represent negligible additional disturbance over other vessel movements, including existing fishing, cargo and tanker traffic. The physical presence of the survey vessels may result in temporary disturbance to individual birds present in the immediate vicinity of the MUL Area.

3.2.5 INDIRECT EFFECTS THROUGH IMPACTS ON PREY AVAILABILITY AND PREY ACQUISITION

Seabirds and seabird communities vary in their susceptibilities to indirect effects through impacts upon prey species.

The noise from the survey activities will be temporary and localised. Therefore, any effects from noise impacting prey availability for seabirds due to the proposed survey activities will be highly unlikely and is therefore considered insignificant.

Increased suspended sediment concentrations (SSC) can displace fish and other mobile invertebrates from disturbed areas. However, the amount of increased suspended sediment concentrations arising from the deployment and placement of the Ocean Bottom Nodes, if deployed, will be low and localized in nature. Given that birds' ability to feed on a wide range of prey and large foraging areas, alongside the low level of disturbance and the low levels of increase suspended sediment, the indirect effects on prey availability as a result of the OBN placement, if deployed, would not be significant.

3.2.6 MORTALITY AND/OR INJURY RESULTING FROM POLLUTION AND LITTER

Seabirds are considered vulnerable to oil pollution, in particular diving birds given the time they spend resting on the water surface, and diving through it in search of food.

Hydrocarbon and polycyclic aromatic hydrocarbon (PAH) contamination is a pressure risk associated with oil spills (uncontrolled releases or incidental spills releasing petroleum hydrocarbons) and includes priority substances listed in Annex II of Directive 2008/105/EC. Oil pollution has the potential to increase the levels of exposure to those compounds on marine species compared to background levels/naturally occurring compounds. The ecological impacts of this for marine species include physical and chemical effects such as smothering, suffocation, clogging of feathers, breathing apparatus, or digestive tract of species at the air/water boundary and a release of toxic chemicals, with dispersants included as they are designed to break up oil spills (Tyler-Walters et al., 2022).

The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78[1]), is an international marine environmental convention which aims to prevent both operational and accidental discharge into the marine from sea going vessels. Ireland ratified the various elements of the MARPOL Convention through the Sea Pollution Act 1991, the Sea Pollution (Amendment) Act 1999 and the Sea Pollution (Miscellaneous Provisions) Act 2006. MARPOL 73/78 was given further legal effect through Statutory Instruments introduced under these Acts. The Acts place a legal obligation upon operators of vessels to implement measures to prevent both

[1] Note MARPOL stands for maritime pollution while 73/78 stands for 1973 and 1978.

operational and accidental discharges from ships of substances, which may damage the marine environment as well as human health.

While the site investigation activities will result in a temporary increase in vessels using the area which increases the risk of accidents and resultant fuel and/or oil spills, an incidence of pollution whether from an accidental occurrence or operational activities is not considered likely considering the legal obligations to comply with MARPOL 73/78 with the increased risk of a pollution event occurring due to these activities considered minimal and not to be over and above existing background risk.

Due to the size of the equipment which is proposed to be used in these site investigation activities, and the distance from shore of the Proposed Licence Area, the survey vessel will be refuelled at sea via the support vessels. During refuelling operations there may be an increased risk of accidental spills however these operations are carried out frequently and to the highest safety standards to ensure risk of a spill are extremely low. Strict protocols will be followed for refuelling at sea, including the use of specialized equipment to minimize the risk of spills or leaks.

All refuelling operations will be supervised by experienced personnel and carried out in favourable weather conditions to reduce the potential for accidents. Additionally, an emergency response plan will be in place to address any unforeseen incidents promptly. These measures are designed to safeguard the marine environments and ensure the refuelling process is both efficient and environmentally responsible.

3.3 ANNEX I BENTHIC HABITATS

Physical disturbance to marine benthic communities and sensitive habitats as a result of site investigation survey activities in the footprint of the proposed MUL area may result in:

- Direct physical disturbance to habitats from bottom contacting equipment/activities (OBNs – if deployed);
- Smothering/scour from increased suspended sediment concentrations (SSC) in the water column arising from the deployment of OBNs (if deployed) on the seabed;

3.3.1 DIRECT PHYSICAL DISTURBANCE

Placement and recovery of Ocean Bottom Nodes (OBNs), if deployed, will cause direct physical interaction with the seabed.

Finer sediments such as those found within the MUL application area (i.e. Deep circalittoral mud, Deep circalittoral sand, and Deep circalittoral coarse sediment) (EUNIS, 2023)) are recoverable to disturbance and typical species can recolonise the area once the SI equipment is retrieved and any disturbance to the sediment will recover naturally (Tyler-Walters *et al.,* 2024).

No significant impacts are predicted during the deployment of OBN via ROV on marine benthic communities. One OBN has an area of 0.031m^2 (0.000000031 km^2). The total spatial footprint of 500 OBNs would cover 0.0000155 km^2 and a coverage of 500 OBNs would take up 0.000229555% of the MUL survey area. The nodes would be in place for the duration of the geophysical marine site

investigation activities (up to 20 days or approx. 3 weeks). In addition, these site investigation activities are conducted in a dynamic area, so it is considered unlikely that physical disturbance to benthic communities will be above any natural levels experienced.

3.3.2 SMOTHERING/SCOUR FROM INCREASED SSC

Suspended sediments concentrations (SSC) may induce smothering of certain species, especially filter feeding species by blocking their feeding apparatus, smothering sessile species or interfering with respiratory function. In certain strong tidal conditions, scour can occur from an increase in SSC.

The proposed site investigation activities that have the potential to interact with the seabed are the use of OBNs, if deployed, which may result in a small amount of sediment to become suspended. OBNs are compact, self-contained units that can be deployed and retrieved without extensive seabed disruption (with each node having a dimension of 200 x 155x 70 mm). When placed on the seabed, each node will only displace a minimal amount of sediment, which quickly resettles around the node. This limited disturbance is localised and temporary.

Techniques used for deployment will include the use of remotely operated vehicles (ROVs) to ensure precise placement and collection, reducing the likelihood of disturbing the sediment. OBNs will be deployed for relatively short periods, (i.e. ~3 weeks). The temporary nature of the deployment will ensure that any minor disturbance to sediment suspension stops once the nodes are retrieved.

3.4 ANNEX II SPECIES

3.4.1 MARINE MAMMALS

Potential effects to Annex II marine mammal species resulting from the proposed site investigation survey activities include:

- Disturbance and displacement resulting in behavioural responses including PTS or TTS from under water noise (which includes geophysical survey and positioning equipment, and vessel noise).
- Mortality or injury due to collision (with survey vessel or equipment).
- Mortality or injury resulting from litter and pollution.

3.4.1.1 DISTURBANCE, DISPLACEMENT, PTS AND TTS RESULTING FROM ANTHROPOGENIC INDUCED UNDERWATER NOISE (SEISMIC SURVEYS AND POSITIONING EQUIPMENT)

The main environmental concern relating to marine mammals is the potential effects of anthropogenic underwater noise (see Nowacek *et al*., 2007 for review), as marine mammals use their auditory ability to locate food, for communication and aid in navigation (Richardson *et al*., 1995). Exposure to noise can induce a range of effects on marine mammals: physical effects may include a temporary reduction in hearing sensitivity (Temporary Threshold Shift (TTS)) which is reversible over time; or following intense noise exposure, Permanent Threshold Shift (PTS). Other effects include masking of biologically important noises (or cues) by anthropogenic noise (perceptual effects); behavioural changes such as displacement from feeding, resting, or breeding grounds; and stress (Southall *et al*., 2007, Southall *et al*., 2019; DAHG, 2014).

Southall *et al*. (2007) divide marine mammals into groups based on their functional hearing, namely low-frequency cetaceans, mid-frequency cetaceans, high-frequency cetaceans, and pinnipeds in water and pinnipeds in air. Updated noise criteria are proposed by the US National Marine Fisheries Service (NMFS, 2016; NMFS, 2018) and Southall *et al*. (2019) criteria, with hearing groups more differentiated (i.e. specifically, the distinction and re-labelling of High Frequency and Very High Frequency cetacean groups) than those set out in Southall *et al*. (2007). The relevant PTS values within the re-labelled groups are identical between NOAA (2018) and Southall et al. (2019) with no substantive change compared to Southall *et al*. (2007).

As Southall *et al.* (2019) is the most recent scientific evidence-based publication on the topic, the 2019 thresholds for received sound levels that have potential to induce the onset of instantaneous PTS and TTS were used for this screening assessment.

DAHG (now DHLGH) 2014 *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* is based on the thresholds detailed in Southall *et al*. (2007), however it is considered the 2019 thresholds are more suitable for the application within the Appropriate Assessment process. For AA, it is required that the assessment screening be based on best scientific knowledge, therefore the more conservative and recently published 2019 thresholds are considered.

Acoustic equipment used during marine site investigations produce sound at frequencies within the hearing range of marine mammals (Nowacek *et al*., 2007).

Annex II marine mammal species from SACs within the Zone of Influence of the proposed SI activities may be affected by underwater noise. Underwater auditory ranges for marine mammal species are summarised in Table 3-4.

Noise characteristics of the proposed survey equipment, including typical operating frequencies and maximum peak sound pressure levels (SPL_{PEAK}), are detailed in Table 3-5 below.

Table 3-4 Underwater Auditory Range for Marine Mammal Species (Southall et al., 2019).

Frequency	Marine Mammal/Species	Estimated Auditory Band Width (kHz) Southall et al. (2019)
Low Frequency Cetaceans	Baleen whales (Minke whale, Humpback whale)	0.007 – 35
High Frequency cetaceans	Most toothed whales and dolphins (including Common & Risso's Dolphin)	0.15 - 160
Very high frequency	Certain toothed whales and porpoises (including Harbour porpoise)	0.2 - 180
Phocids carnivores in water (PCW)	Grey seal & harbour seal	0.05 - 86

Table 3-5 Noise sources during site investigation activities.

Survey technique	Operating frequency (kHz)	Sound pressure level (SPL_{PEAK}) (dB re 1µPa @1m)	Sound Exposure Level (SEL_{PEAK} (unweighted); dB re 1µPa^{-2}s)	Source/ Reference
Impulsive				
Airgun Array (2000 psi, 4500 in^3)	0.005 - 0.3	230–260		Multiple GI-Source or other airguns (Duffy *et al*., 2023; Hildebrand, 2009)
Multi-beam Echosounder (MBES) (<200m)	170 - 700	198 - 228		Sonic 2024-V or the Kongsberg EM2040 MKII (Kongsberg, 2024a; R2Sonic, 2024)
Side Scan Sonar (SSS)	500-900 (high)	196 - 224		L3 Klein 5000, Egetech 4200 (Duffy *et al*., 2023; Ruppel *et al.*, 2022)
Sub Bottom Profiler (Parametric Pinger)	1 - 115	206 - 247		TOPAS, Innomar systems (Ruppel *et al.*, 2022)
Sub Bottom Profiler (Sparker)	0.3 – 1.4	185 - 226		Applied Acoustics Delta Sparker, SIG ELC sparker (Duffy *et al*., 2023; Ruppel *et al*., 2022)

Survey technique	Operating frequency (kHz)	Sound pressure level (SPL_{PEAK}) (dB re 1µPa @1m)	Sound Exposure Level (SEL_{PEAK} (unweighted); dB re 1µPa^{-2}s)	Source/ Reference
Sub Bottom Profiler (Boomer)	0.3 - 3	185 - 207		Applied Acoustics S-boom (Duffy *et al*., 2023; Ruppel *et al*., 2022)
USBL (Ultra Short Baseline)	18-32	192 - 207		Kongsberg HiPAP, Applied Acoustics EasyTrak Nexus Model EZT-2691 (Applied Acoustics, 2024; Kongsberg, 2024b)
Vessel noise	0.05 – 0.3	N/A	150 – 175	Southall *et al*., 2007

The sound pressure levels that would result in injury (PTS or TTS) that were proposed for individuals exposed to pulsed and non-pulsed sound sources are provided in Table 3-6 below for each of the marine mammal groups considered in Table 3-4.

Table 3-6 Thresholds (SPLPEAK; dB re 1µPa @1m) of marine mammal hearing groups to assess the potential for PTS and TTS from pulsed and non-pulsed sound sources (Southall et al., 2019)

Auditory Group	Marine Mammal/Species	Pulsed Sound (Air guns) (SPL_{PEAK} (weighted); dB re 1 µPa @1m)		Non-pulsed Sound (vessels, chirpers) (SEL_{PEAK} (unweighted); dB re 1 µPa^{2}s)	
		PTS onset	TTS onset	PTS onset	TTS onset
Low Frequency Cetaceans	Baleen whales (Minke whale, Humpback whale)	219	213	199	179
High Frequency Cetaceans	Most toothed whales and dolphins (including Common & Bottle-nosed Dolphin)	230	224	198	178
Very High Frequency Cetaceans	Certain toothed whales and porpoises (including Harbour porpoise)	202	196	173	153
Phocid carnivores in water	Grey seal & Harbour seal	218	212	201	181

3.4.1.2 INDIRECT EFFECTS THROUGH IMPACTS ON PREY AVAILABILITY AND PREY ACQUISITION

Potential effects on prey species of marine mammals include underwater noise, increase suspended sediment concentrations and sediment re-deposition, and physical disturbance to and temporary loss of seabed habitat (e.g. nursery and spawning grounds including reefs).

Cetaceans including the Harbour Porpoise and Bottlenose Dolphin, and pinnipeds, the Grey and Common/Harbour seal, have a wide variety of prey species that vary geographically and seasonally, reflecting availability of food resources. Marine mammals such as the harbour porpoise and bottlenose dolphin have high daily energy requirements, and as a result need to capture enough prey to meet these demands.

As outlined above, the potential for any effects on prey species from physical disturbance and/or temporary loss of seabed habitat or the potential effects of SSC on benthic habitats and fish is unlikely.

Potential for significant effects of underwater noise on prey species is not considered likely as marine mammals are more sensitive to noise than prey species and would also be deterred/disturbed from an area of potential prey displacement.

3.4.1.3 MORTALITY OR INJURY DUE TO COLLISION (WITH SURVEY VESSELS)

Cetaceans often surface to breathe, making them vulnerable to vessel strikes, especially in areas with high maritime traffic.

Survey vessels used for site investigations may pose a collision risk to these species, especially if the vessel(s) operate in previously low-traffic zones, introducing traffic in specific areas of importance to these species. Survey vessels often follow specific transect patterns, which can overlap with habitats or migratory routes. Transects can be repeated and pass over the same area multiple times which potentially increases the risk of collision. During the geophysical marine site investigation activities, transects are rarely repeated, however, the planned survey will operate within the MUL application area over a period of weeks. Noise generated by survey equipment can disorient or attract marine species, which may increase collision risk.

Marine mammals accustomed to vessel movements may exhibit localised avoidance rather than large-scale displacement. They might move temporarily away from the survey vessel and return once the activity ceases, thereby reducing the impact on their overall behaviour and habitat use. The key factors contributing to collision between marine mammals and vessels are the presence of both in the same area and vessel speed (see Schoeman *et al*., 2020 for review). Injuries to marine mammals from vessel collisions are species-dependent but generally are more severe at higher impact speeds (Wang *et al*., 2007). Vessels involved in survey activities, including support vessels, will be travelling through the MUL area at less than 5 knots.

Vessel strikes are a known cause of mortality in marine mammals (Laist *et al*., 2001). Non-lethal collisions have also been documented with vessels (Laist *et al*., 2001; Van Waerebeek *et al*., 2007). Injuries from such collisions can be divided into two broad categories: blunt trauma from impact and lacerations from propellers. Injuries may result in individuals becoming vulnerable to secondary

infections or predation, leading to death. However, it is largely recognised that the key factors contributing to collision between marine mammals and vessels is speed (see Schoeman *et al*., 2020 for review). Injuries to marine mammals from vessel strikes are species-dependent but are generally more severe at higher impact speeds, with ships travelling at 14 knots or faster being the most likely to cause lethal or serious injuries (Wang *et al*., 2007).

The vessels undertaking these surveys are likely to be travelling considerably slower (less than 5 knots) than this while engaged in the survey activities, thus allowing both the vessel and any animal in the area time to avoid collision. The predictable trajectory of geophysical survey vessels has an additional benefit of further reducing the risk of collision with marine mammal species. Slower vessels following a consistent trajectory allow cetaceans the opportunity to avoid collisions.

Neutral reactions of marine mammals have been observed with larger, slower moving vessels (e.g. cargo ships) compared to fast, unpredictable boats (e.g. speedboats) where marine mammals exhibit avoidance behaviour (Leung & Leung, 2003; Sini *et al.,* 2005).

The species in the area are exposed to marine traffic on a regular basis and should therefore be accustomed to vessel movements. Therefore, the collision risk posed by the proposed survey is likely to be significantly lower than that posed by existing shipping activity. The limited number of vessels (three; a survey vessel and two chase/guard vessels using the area) that will be required for these surveys will not significantly increase vessel traffic in the area.

3.4.1.4 MORTALITY OR INJURY RESULTING FROM LITTER AND POLLUTION

Marine mammals are considered highly vulnerable to oil pollution through inhalation, ingestion and dermal pathways, due to the regular frequency at which marine mammals will surface to breathe and/or rest, and to breach. Effects on marine mammals from an accidental oil pollution event can largely depend upon prey species (Venn-Watson, *et al*., 2015). Effects may include toxic effects and secondary organ dysfunction from consuming oiled prey; damaged airways and interstitial emphysema due to inhalation of oil droplets/vapour when re-emerging to take a breath, rest and/or breach; skin lesions due to long exposure to oil; and the ingestion of oil during grooming can cause ulceration and haemorrhaging (Helm, *et al*., 2014). Other subsequent consequences are stress and behavioural changes, and a restricted diet and subsequent decrease in body mass.

3.4.2 ANNEX II ANADROMOUS FISH

The primary means of identifying relevant species and consequent SACs for which Annex II anadromous fish species are listed is based on their geographical range (i.e. occurrence in relation to this site), seasonal patterns/variations, life cycles and their biology (noise sensitivity/swim bladders in detecting sound potentially inducing barotrauma) referencing thresholds of potential susceptibility to damage by sound from geophysical site investigation activities. Details of the fish assessment is described further below.

Atlantic Salmon (*Salmo salar*) are listed in Annex II of the EU Habitats Directive (92/43/EEC) and their conservation in freshwater is mandated in European countries (i.e. spawning grounds in freshwater systems for protection). However, it should be noted, their conservation status in Ireland is classified

as vulnerable due to a decline in abundance, caused primarily by mortality at sea, habitat loss, barriers to migration, poor water quality, overfishing and sea lice (Inland Fisheries Ireland, accessed online 12/03/2024). As Atlantic Salmon, as well as Shad species Twaite and Allis, have a homing system, returning to their natal river and spawning grounds, any barrier to species movement resulting from survey activities, either as adult salmon returning to their natal river to spawn, or as young salmon smolts migrating out to sea must be assessed in cases where estuaries enter the sea with known salmon migration.

As freshwater brook lamprey (*Lampetra planeri*) lives exclusively in freshwater, remaining in both large and small river channels (typically in smaller rivers), this species, unlike the other lamprey species, is not an anadromous fish and do not reside in brackish waters found within estuaries. Freshwater white-clawed crayfish (*Austropotamobius pallipes*) (FWCC) are freshwater relatives of the marine lobsters and are found in rivers, streams and lakes particularly in those with a calcareous influence. Their distribution is restricted to freshwater systems and this species have no dependency (no connection) on the marine environment to complete their life-cycle. As all proposed site investigations are located within the marine environment, brook lamprey and FWCC are identified as having no source-pathway-receptor.

The potential effects on Annex II anadromous fish QIs from the proposed survey activities are:

- Injury and disturbance from underwater noise generated from geophysical survey activities
- Mortality or injury resulting from litter and pollution event.

3.4.2.1 DISTURBANCE, DISPLACEMENT AND INJURY FROM UNDERWATER NOISE FROM GEOPHYSICAL SURVEYS

Underwater anthropogenic sound (such as geophysical site investigations,) can cause physical, physiological and behavioural impacts on fishes. It is widely known that underwater sound can kill, cause a wide range of physiological impacts, and result in behavioural changes affecting the fitness and survival of fishes (Popper et al., 2014). Fish use either detect kinetic energy in the form of particle motion or detect sound pressure for detecting sound; while all fish detect and use particle motion hearing it is the presence of ancillary hearing structures that determines their hearing sensitivity. Only a subset of fish can detect sound pressure (Putland et al., 2018). It is suggested that by detecting sound pressure, it is thought to broaden the bandwidth and increase noise sensitivity in fishes while potentially contributing to sound source localisation (Popper, et al., 2022).

Fish vary in their abilities to detect sound as well as their susceptibility to damage by sound (Popper et al., 2014) and are assessed in further detail in Section 5 below. Fish species are either hearing specialists (e.g. Twaite Shad and Allis Shad) or hearing generalists (Atlantic Slamon and lamprey species) with only the former being directly susceptible to underwater noise. In general, fish species without a swim bladder (i.e., lamprey, sharks, some flatfish and tunas), or those that have small or reduced swim bladders (i.e. typically, benthic species, including some flatfish), tend to have relatively poor auditory sensitivity and generally cannot hear sounds at frequencies above 1 kHz. Hearing for these fish involves particle motion, not sound pressure (NOAA, 2016).

Fish species with anatomical specializations between the swim bladder and the ear generally have lower thresholds and wider hearing bandwidths than species without such specializations and may have greater ability to detect, and therefore respond to sound pressure. This is the case of fish belonging to clupeiform species (e.g., shad, herring, sardines, and alewives). Clupeids of the shad family (Alosinae) in particular, have shown sensitivity to a range of frequencies that can extend to >100 kHz. (Mann et al., 2001). Teague & Clough (2011) recorded positive significant reactions in juvenile twaite shad to sound frequencies of between 30 and 60 kHz with a peak at 45kHz. Behavioural studies of the responses of American shad to ultrasound (Mann et al., 2001; Popper et al., 2004) demonstrate that they show a graded series of responses depending on the sound level and, to a lesser degree, on the frequency of the stimulus. Low-intensity stimuli elicit a non-directional movement of the fish, whereas somewhat higher sound levels elicit a directional movement away from the sound source and still higher-level sounds produce a ‘‘wild’’ chaotic movement of the fish.

Fish that possess swim bladders but without anatomical connections typically do not show a comparable degree of hearing sensitivity to shad. For example, Atlantic Salmon (*Salmo salar*) have poor hearing sensitivity and are only capable of detecting low frequency tones (below 380 Hz) and particle motion rather than sound pressure (NOAA, 2016). Species with a swim bladder have a greater potential to suffer from barotrauma from sudden pressure changes (e.g., from sudden changes to sound pressure) than those without swim bladders (Popper, et al., 2014).

Mickle et al. (2009) tested auditory responses in the sea lamprey, which do not possess swim bladders, and found sea lampreys can detect noise frequencies of 50–300 Hz with equal sensitivity but did not detect sounds above 300Hz. While shipping noise is likely audible to lamprey, lamprey are not sensitive to sound pressure. However, as adults, metamorphosed Sea and River Lamprey are parasitic, hematophagous (external) feeders that can parasitize upon an extensively broad range of fish, elasmobranchs, cephalopods, and marine mammals, however, in particular, Atlantic Salmon and adult Shad are their preferred host (OSPAR, 2009). Therefore, their distribution is largely dictated by their host species. Parasitic Lamprey do not display homing behaviour, relying on their host to return to a freshwater course to spawn. It is therefore considered that any impact from the site investigation activities that affects their hosts, Atlantic Salmon and adult shad species (twaite and allis), may also have significant effects on Sea and River Lamprey by reducing the host availability to complete their life cycle. The examination of Sea and River Lamprey includes examination of impacts to their annexed host species.

Temporary threshold shift (TTS) is a non-injurious temporary reduction in hearing sensitivity caused by exposure to intense sound. TTS has been documented in some fish, though only after multiple exposures to intense sounds (e.g. 190 dB re 1 µPa rms) or as a result of long-term exposure (e.g. tens of minutes or hours) to less intense sounds (Popper & Hawkins, 2019). Popper & Hawkins (2019) suggest that, as sensory hair cells are constantly added in fish and replaced when damaged, both hearing specialists and generalists were able to recover from varying levels of substantial TTS in less than 18 hours after exposure. Permanent hearing loss has not been documented in fish (NOAA, 2016).

Popper & Hawkins (2019) suggest that exposure to very high intensity low and mid-frequency sonars and seismic airguns does not result in mortality in fish. They found that fish experienced damage to body tissues (i.e. barotrauma) after receiving high intensity impulsive sounds.

As the site investigation activities will produce high intensity impulsive noise fish species that use sound pressure to hear may be directly impacted by the site investigation activities. Twaite shad may therefore be impacted by some of the geophysical marine site investigation activities and shipping noise. Given that twaite, allis and the American shad are in the same genus (Alosa) and are morphometrically similar, allis shad may be similarly sensitive to underwater noise.

The physical presence of the survey vessel and the site investigation activities may introduce vibration and noise to the underwater environment. Use of geophysical survey and positioning equipment may potentially cause disturbance to certain fish species such as hearing specialists Twaite Shad and Allis Shad, and potentially affect host availability for the parasitic feeders, Sea and River Lamprey, if the operating frequencies of the sound emitted falls within their hearing range. Therefore, likely or possible effects of underwater noise on Annex II fish species from these activities cannot be excluded.

Please see Section 3.3.1 for details on operating frequencies and sound pressure levels of the proposed equipment to be used during geophysical surveys.

3.4.2.2 MORTALITY OR INJURY RESULTING FROM POLLUTION/LITTERING EVENT

Pollution and littering can directly impact on the fitness and health of species/communities connected with the marine environment, which could in turn alter habitat structure/habitats. Annex II fish species can be affected from a pollution/littering event which could result in death or induce a reduction in health and fitness levels in populations (i.e. feeding and breeding success).

As previously discussed above in Section 3.2.3 (Marine Ornithology), the potential for accidental discharge and spillage of oils, fuels and materials will be managed through compliance with MARPOL. Therefore, likely or possible significant effects from accidental littering or a pollution event on Annex II anadromous fish species from the survey activities and vessels are not considered likely and can be excluded.

4 SCREENING FOR APPROPRIATE ASSESSMENT (AA)

This Chapter outlines the criteria used for defining the Zone of Influence (ZOI)[2] relevant to the potential impacts of the proposed site investigation works, outlines how European Natura 2000 sites have been identified (i.e. using the Source-Pathway-Receptor model) and describes the sites which have been identified as having the potential to be affected by the proposed works. In determining the ZoI of the proposed SI survey activities on relevant SPAs, SACs, SCIs and QIs, guidance issued by the Office of the Planning Regulator, OPR Practice Note 01:PN01 (OPR, 2021) was used for the Source-Pathway-Receptor (S-P-R) model.

"A European site will only be at risk from likely significant effects where the Source-Pathway-Receptor link exist between the proposed development and the European site" (OPR, 2021).

The European Natura 2000 site information is based on the most up-to-date data available from the site synopses published by the National Parks and Wildlife Service (NPWS, www.npws.ie), the Joint Nature Conservation Committee (JNCC, https://jncc.gov.uk/) and the European Commission (https://ec.europa.eu/environment/nature/natura2000/index_en.htm).

Note, candidate Natura 2000 Sites (cSAC and cSPA) were also considered and were given equal consideration to SACs and SPAs.

The chapter continues to consider the Likely Significant Effect (LSE) to sites. QIs of SACs and SCIs of SPAs are assessed, with the assessment taking into account connectivity with European sites within Ireland as well as further afield (i.e. transboundary considerations). Potential connectivity includes direct effects (i.e. overlap with the MUL area and a European site), and indirect effects (i.e. if the European site is within range of the effects of the proposed survey activities).

4.1 ZONE OF INFLUENCE OF THE SITE INVESTIGATION ACTIVITIES

The following SACs and SPAs have been identified as potentially falling within the ZOI of the proposed works:

- Any SAC within or adjacent to the MUL application area designated for Annex I habitats which have the potential to be affected by the proposed works given the nature of the activities using the S-P-R model (Figure 4-1). It should be noted, as the proposed SI activities for this MUL application are located completely within the marine environment no pathway has been identified to purely terrestrial habitats without any marine element (i.e. terrestrial habitats are outside the ZoI).

[2] The zone of influence (ZOI) of a project is the area over which ecological/environmental features may be affected by biophysical changes as a result of the proposed project and associated activities. This has the potential to extend far beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.

- Any SAC designated for mobile Annex II species which have the potential to occur within the MUL application area and be affected by the works (Table 4-6, and Figure 4-2 and Figure 4-3). Depending on the QI, foraging distances and/or management units (Celtic and Irish Sea) have been used to determine relevant sites for screening. Foraging ranges may be in the region of 448 km for Grey Seal, 273 km for Common (Harbour) Seal, or the limits of the management units for Bottle-nosed Dolphin and Harbour Porpoise.
- Any SPA (or cSPA) designated for birds, including SPAs with breeding seabirds listed as species of Special Conservation Interests (SCIs), which have the potential to occur within the MUL application area and be affected by the proposed works are considered within this screening (Figure 4-4 to Figure 4-6 ,
- Table 4-5). Indicative breeding season mean maximum foraging ranges from Woodward *et al*. (2019) have been used to determine relevant species (Table 4-4), where mean maximum is the maximum range reported in each study averaged across studies. See Appendix I for a description of how the mean maximum foraging ranges have been used to determine relevant sites and Woodward *et al.*, 2019, for the criteria used for assigning confidence levels. Considering the very temporary and localised nature of the effects of the proposed activities, a conservative ZoI is adopted with respect to SPAs and their SCIs, with all those sites in the vicinity of the MUL application area considered. For migratory and wintering species of wildfowl and wader species outside the breeding season, and wintering gull populations at estuarine SPAs, sites if within 15 km of the MUL application area have been considered.

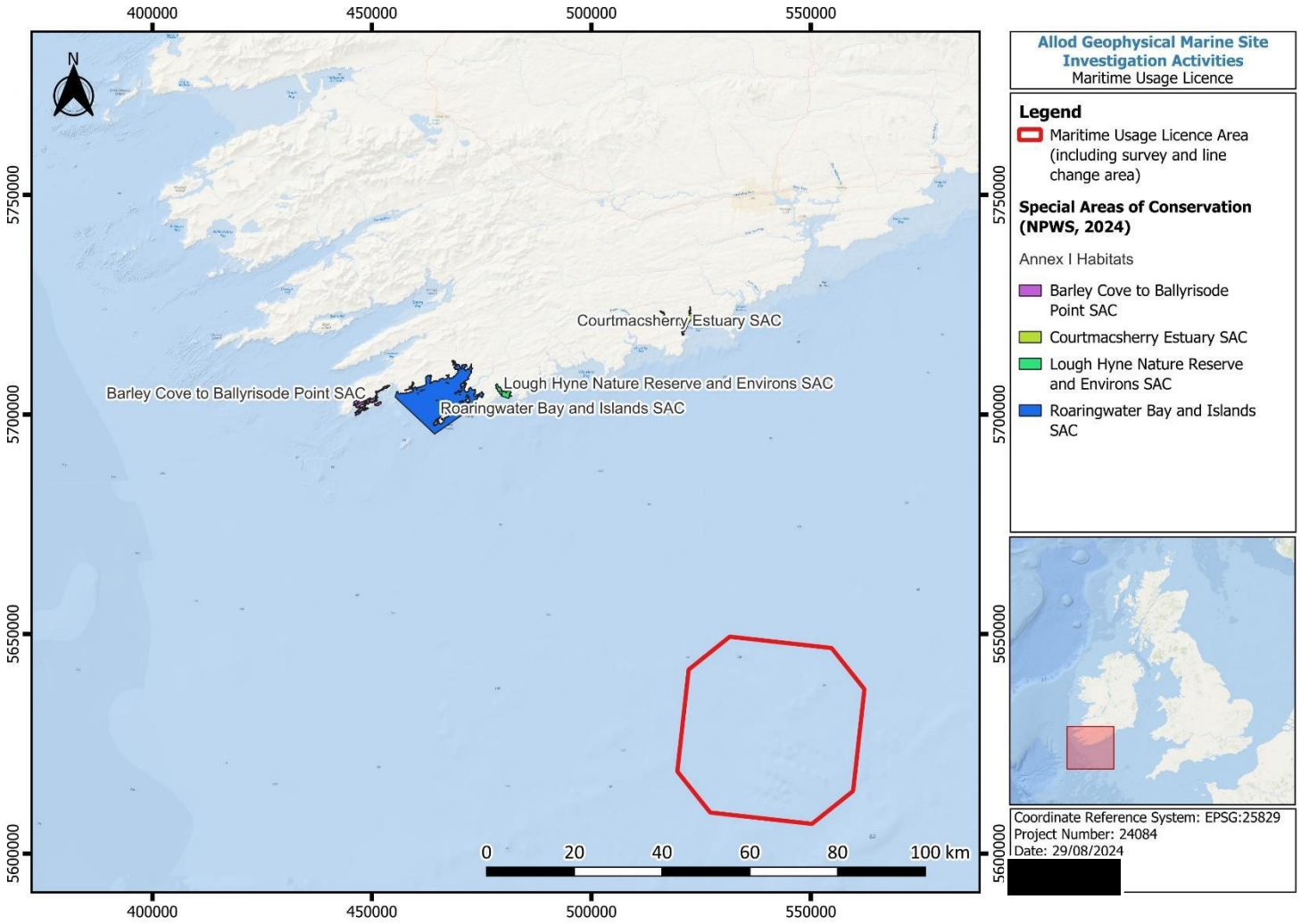

Figure 4-1: Annex I Habitat SACs

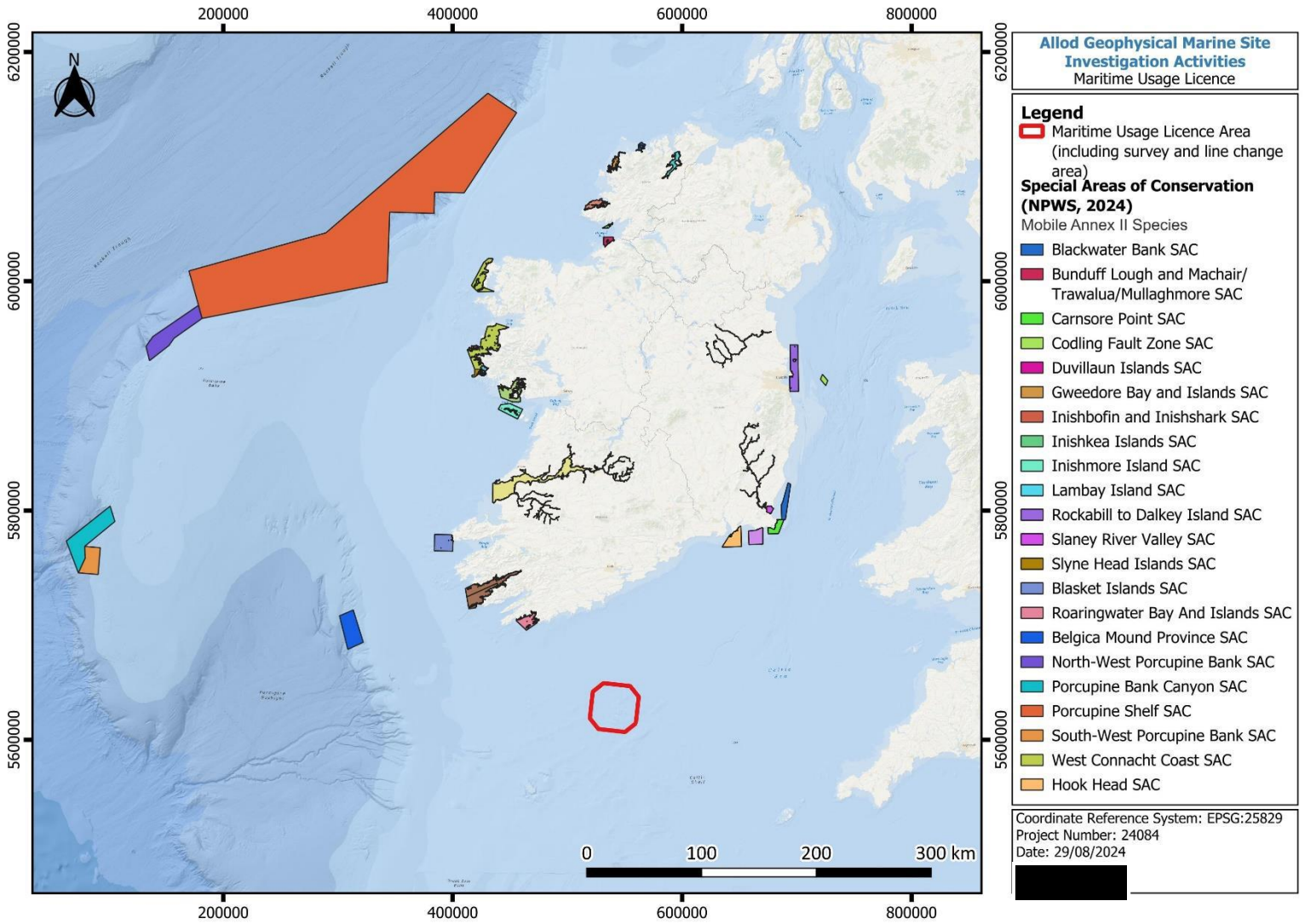

Figure 4-2: Irish SACs for Annex II Mobile Species

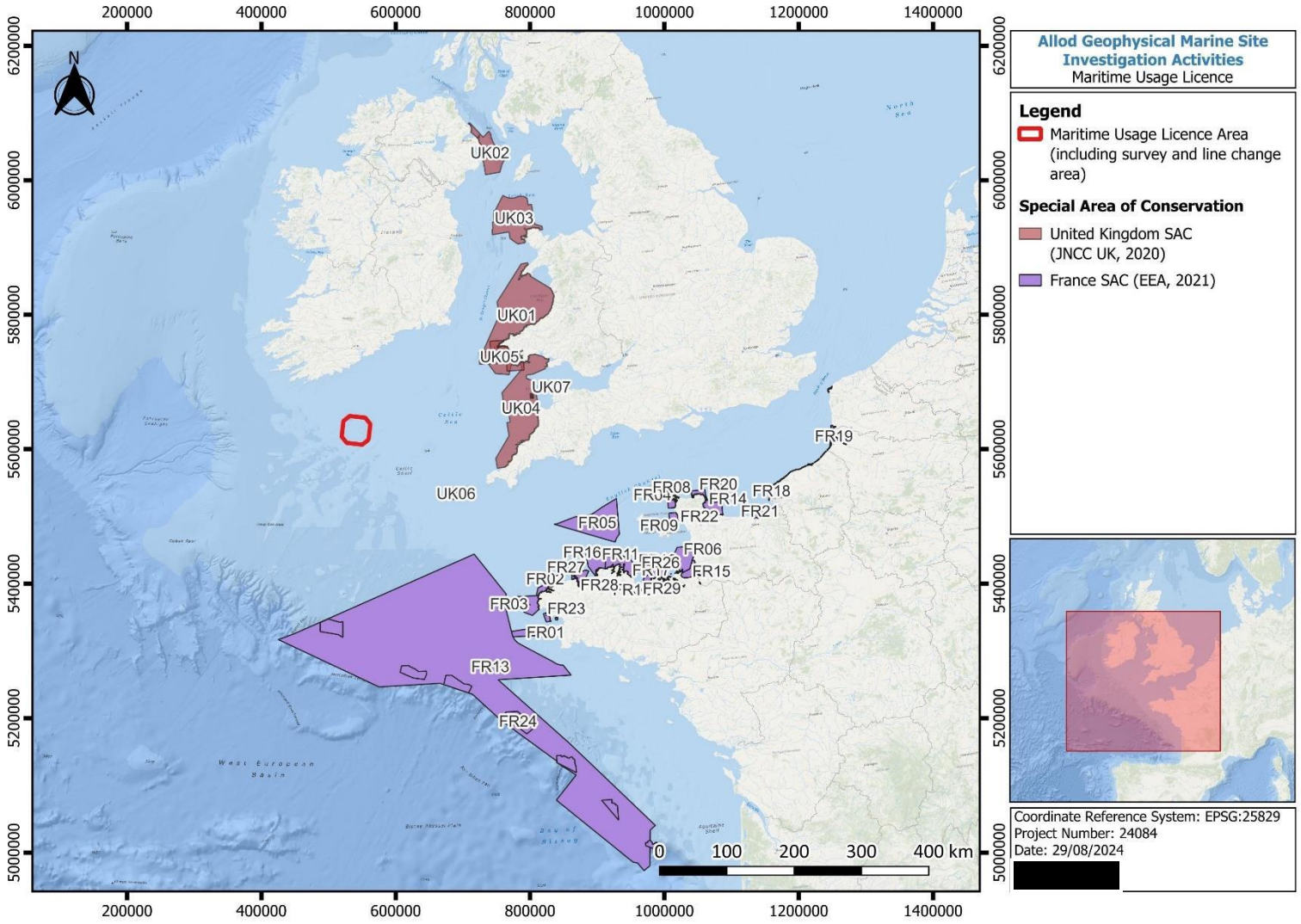
Allod Geophysical Marine Site Investigation Activities
Maritime Usage Licence
Legend
Maritime Usage Licence Area (including survey and line change area)
Special Area of Conservation
United Kingdom SAC (JNCC UK, 2020)
France SAC (EEA, 2021)
Coordinate Reference System: EPSG:25829
Project Number: 24084
Date: 29/08/2024
N
200000
400000
600000
800000
1000000
1200000
1400000
6200000
6000000
5800000
5600000
5400000
5200000
5000000
UK01
UK02
UK03
UK04
UK05
UK06
UK07
FR01
FR02
FR03
FR04
FR05
FR06
FR08
FR09
FR11
FR13
FR14
FR15
FR16
FR18
FR19
FR20
FR21
FR22
FR23
FR24
FR26
FR27
FR28
FR29
0
100
200
300
400 km

Figure 4-3: UK and French SACs for Annex II Mobile Species (JNCC, 2020) and France (EEA, 2021)

Table 4-1 UK and France SAC Annex II Mobile Species Map Keys

SITE CODE	SITE NAME UK	Label
UK0030397	West Wales Marine / Gorllewin Cymru Forol	UK01
UK0030399	North Channel	UK02
UK0030398	North Anglesey Marine / Gogledd Môn Forol	UK03
UK0030396	Bristol Channel Approaches / Dynesfeydd Môr Hafren	UK04
UK0013116	Pembrokeshire Marine/ Sir Benfro Forol	UK05
UK0013694	Isles of Scilly Complex	UK06
UK0013114	Lundy	UK07

SITE CODE	SITE NAME France	Label	SITE CODE	SITE NAME France	Label
FR5302007	Chaussée de Sein	FR01	FR2500077	Baie du Mont Saint-Michel	FR15
FR5300017	Abers - Côte des légendes	FR02	FR5300009	Côte de Granit rose-Sept-Iles	FR16
FR5300018	Ouessant-Molène	FR03	FR5300012	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard	FR17

SITE CODE	SITE NAME France	Label	SITE CODE	SITE NAME France	Label
FR2502019	Anse de Vauville	FR04	FR2300139	Littoral Cauchois	FR18
FR2502022	Nord Bretagne DH	FR05	FR2200346	Estuaires et littoral picards (baies de Somme et d'Authie)	FR19
FR2500079	Chausey	FR06	FR2500085	Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire	FR20
FR2500085	Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire	FR07	FR2502021	Baie de Seine Orientale	FR21
FR2500084	Récifs et landes de la Hague	FR08	FR2502020	Baie de Seine Occidentale	FR22
FR2502018	Banc et récifs de Surtainville	FR09	FR5302006	Côtes de Crozon	FR23
FR5300011	Cap d'Erquy-Cap Fréhel	FR10	FR5302016	Récifs du talus du golfe de Gascogne	FR24
FR5300010	Tregor Goëlo	FR11	FR3100478	Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant	FR25
FR5300066	Baie de Saint-Brieuc - Est	FR12	FR5300052	Côte de Cancale Parame	FR26

SITE CODE	SITE NAME France	Label	SITE CODE	SITE NAME France	Label
FR5302015	Mers Celtiques - Talus du Golfe de Gascogne	FR13	FR5300015	Baie de Morlaix b	FR27
FR2502020	Baie de Seine Occidentale	FR14	FR5310073	Baie de Morlaix a	FR28
			FR5300061	Estuaire de la Rance	FR29

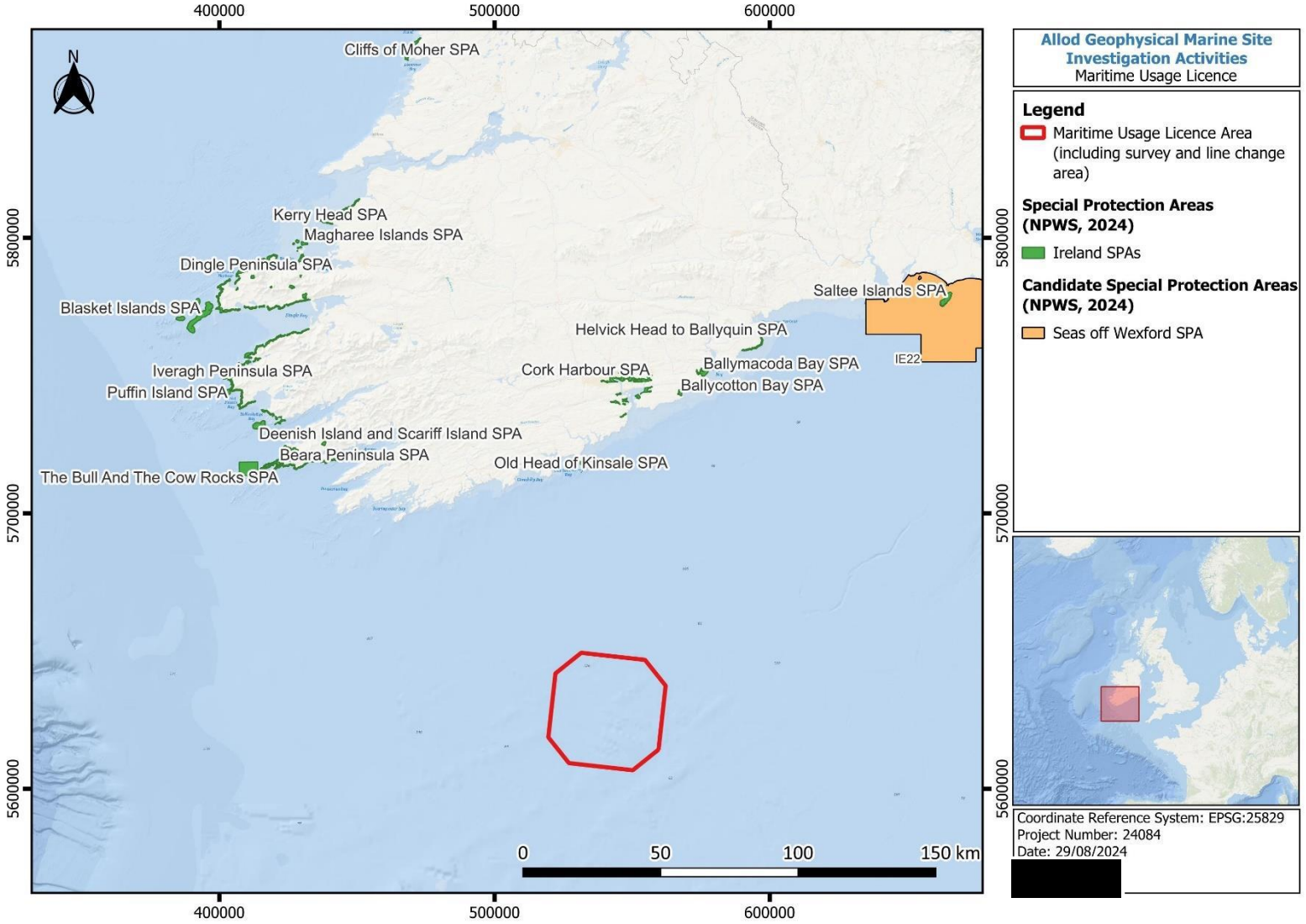

Figure 4-4 Irish SPAs in the vicinity of the Licence Area

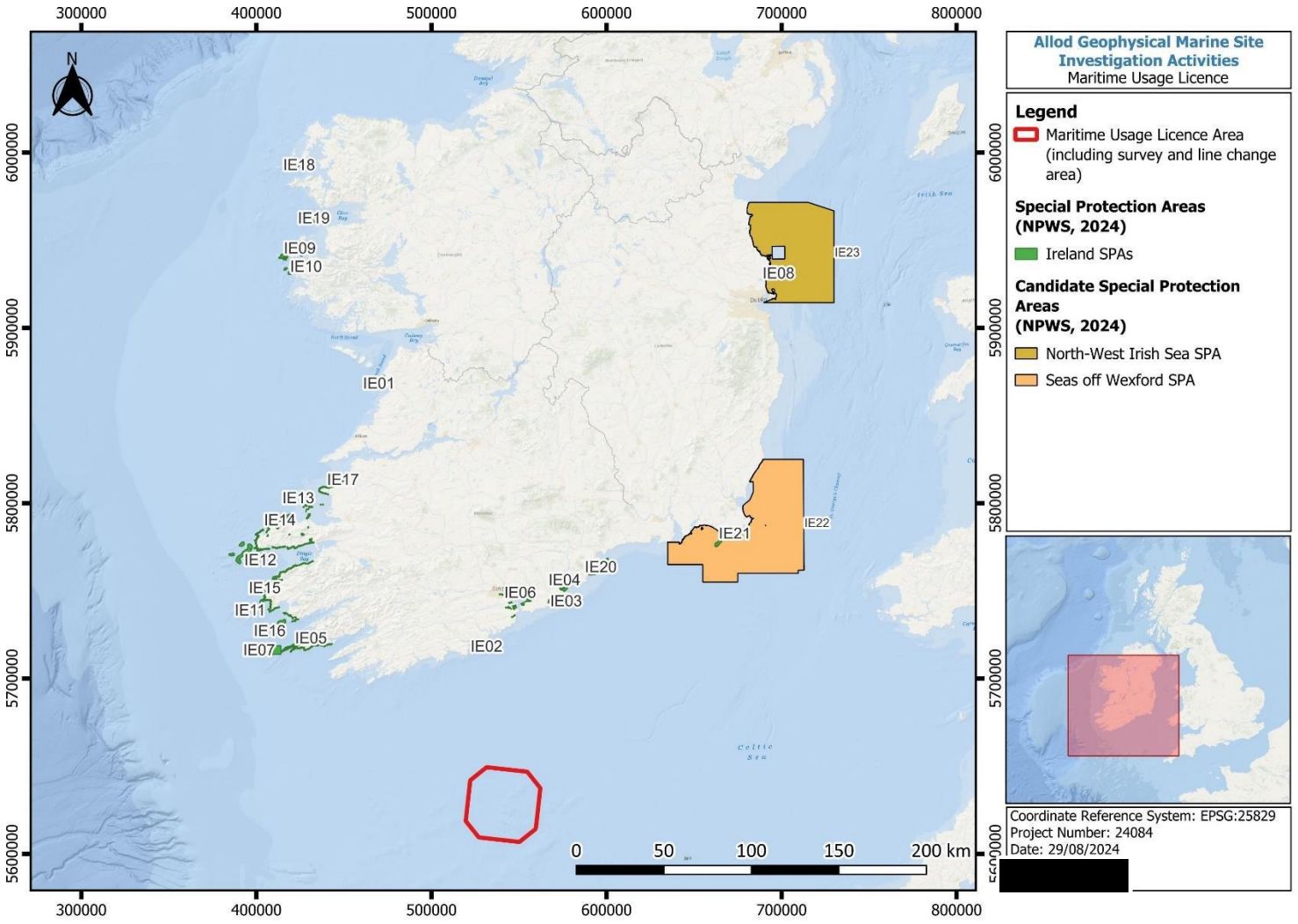

Figure 4-5: SPAs Ireland

Table 4-2 SPAs Ireland Map Key

Site Code	Site Name	Label
004005	Cliffs of Moher SPA	IE01
004021	Old Head of Kinsale SPA	IE02
004022	Ballycotton Bay SPA	IE03
004023	Ballymacoda Bay SPA	IE04
004155	Beara Peninsula SPA	IE05
004030	Cork Harbour SPA	IE06
004066	The Bull And The Cow Rocks SPA	IE07
004069	Lambay Island SPA	IE08
004144	High Island, Inishshark and Davillaun SPA	IE09
004170	Cruagh Island SPA	IE10
004003	Puffin Island SPA	IE11
004008	Blasket Islands SPA	IE12

Site Code	Site Name	Label
004125	Magharee Islands SPA	IE13
004153	Dingle Peninsula SPA	IE14
004154	Iveragh Peninsula SPA	IE15
004175	Deenish Island and Scariff Island SPA	IE16
004189	Kerry Head SPA	IE17
004111	Duvillaun Islands SPA	IE18
004136	Clare Island SPA	IE19
004192	Helvick Head to Ballyquin SPA	IE20
004002	Saltee Islands SPA	IE21

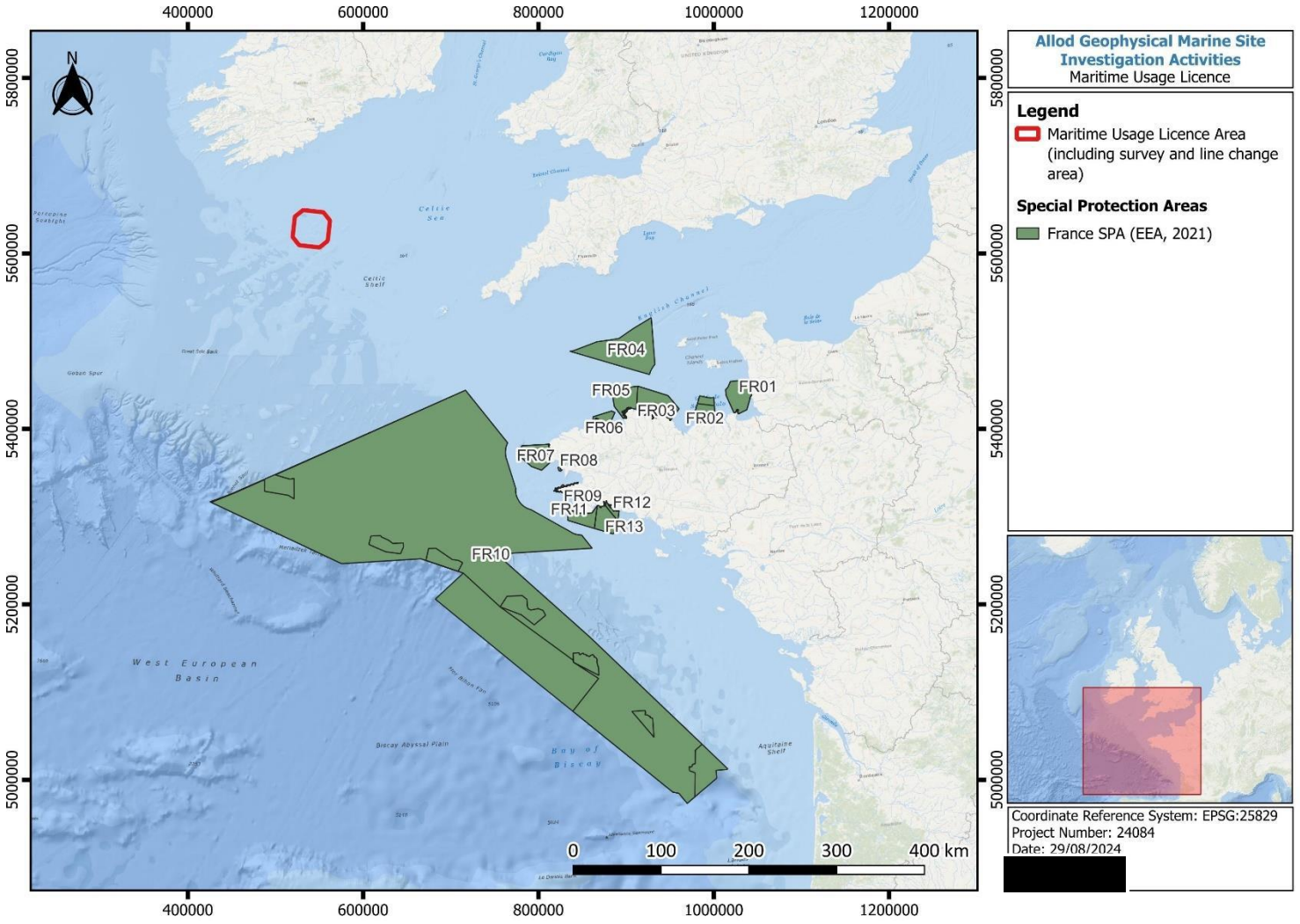

Figure 4-6: French SPAs (EEA, 2021)

Table 4-3 SPAs France Map Key

Site Code	Site Name	Label
FR2500079	Chausey	FR01
FR5300011	Cap d'Erquy-Cap Fréhel	FR02
FR5300010	Tregor Goëlo	FR03
FR2512005	Nord Bretagne DO	FR04
FR5310011	Cote de Granit Rose-Sept Iles	FR05
FR5300015	Baie de Morlaix	FR06
FR5300018	Ouessant-Molène	FR07
FR5312004	Camaret	FR08
FR5300020	Cap Sizun	FR09
FR5212016	Mers Celtiques - Talus du golfe de Gascogne	FR10
FR5312009	Roches de Penmarc'h	FR11
FR5300049	Dunes et côtes de Trévignon	FR12
FR5300023	Archipel de Glenan SPA	FR13

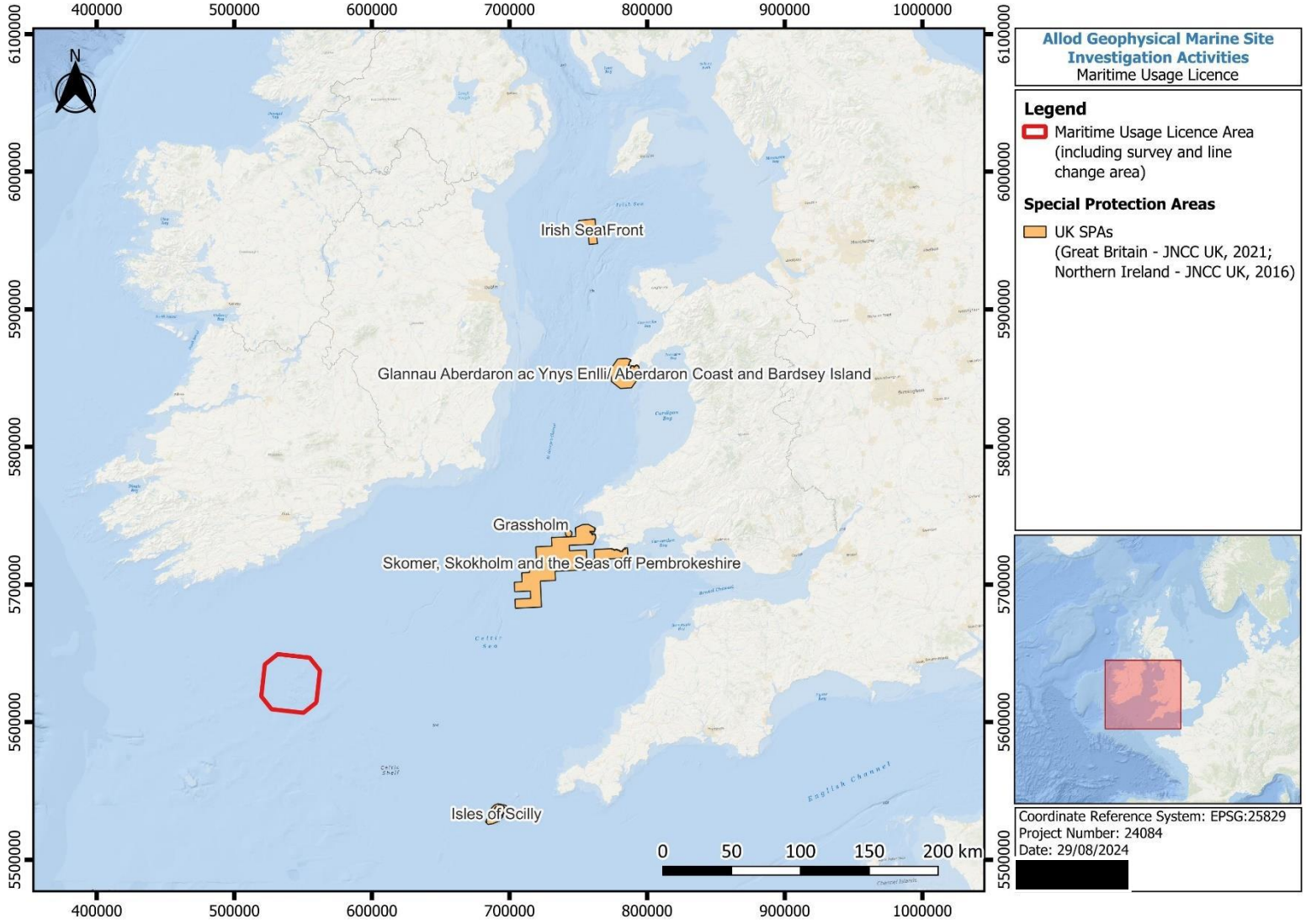

Figure 4-7 UK SPAs in the vicinity of the MUL Area

4.2 PRE-SCREENING OF NATURA 2000 SITES USING SOURCE-PATHWAY-RECEPTOR MODEL AND ASSOCIATED DESIGNATED INTERESTS

A Source-Pathway-Receptor (SPR) model has been used to identify the existence and characteristics of the pathways that could link these European sites in the ZOI of the proposed site investigation activities, and their Qualifying Interests to the proposed site investigation activities as outlined in OPR Practice Note 01: PN01 (OPR, 2021).

As outlined in Office of the Planning Regulator (2021) "*The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15 km)*."

Full European site and feature background information has not been reproduced from the NPWS website as PN01 states "short paraphrasing and/or cross reference to NPWS is acceptable – it is not necessary to reproduce the full text on the QI/SC"; instead, the relevant information has been paraphrased with NPWS resources referenced as appropriate**.**

Please note:

- Where site investigation activities are located outside of and not adjacent to SACs, no source-pathway-receptor connection has been identified to the designated Annex I habitats within these SACs.

It should be noted, a pre-screening has been undertaken to identify European Sites (i.e. SACs and SPAs) with the Qualifying Interests of Annex I habitats, Annex II marine mobile species (marine mammals, otter and migratory fish) and the Special Conservation Interests of SPAs to be considered in the Stage 1 Screening for Appropriate Assessment. This approach allowed for the assessment of impacts to be focused on the impacts that could potentially have likely significant effects on the receiving European Sites (i.e. the Annexed habitat/species).

4.2.1 MARINE ORNITHOLOGY

Ireland is a highly important breeding, wintering and migratory stop-over destination for many species of birds. The estuaries, coastal sea cliffs and offshore islands of Ireland are host to nationally and internationally important assemblage of seabirds (diving and surface feeding spp.), shorebirds (i.e. wader and dabbler spp.) and wildfowl (passerines), and as such many sites are designated as SPAs for these SCI bird species under the terms of the EU Birds Directive (2009/147/EC) and are protected under national legislation (i.e. Wildlife Acts, as amended).

The primary means of identifying relevant SCI species of relevant SPAs for this proposed project is based on their foraging ranges, their method of foraging, their occurrence in relation to the Site, and predicted density distributions of the relevant species in the MUL application area.

For seabirds, waders and waterfowl SCIs during the breeding season, foraging distances of breeding SCIs between an SPA and the proposed SI activities was screened for potential connectivity using the published information on foraging ranges from Woodward *et al.* (2019). The mean-maximum foraging

ranges of the SCIs of relevant SPAs were used to predict if the SCIs were within distance of the MUL application area to forage, pass through or undertake other behaviours (i.e. bathing and preening). Within Table 4-4, the mean-max foraging range of relevant breeding seabird SCIs are provided.

Table 4-4 Indicative breeding season foraging ranges (in bold) and associated confidence levels (Woodward et al. 2019).

Indicative breeding season foraging ranges		
Species	Mean maximum (km ± SD)	Confidence Level
Eider	**21.5**	Poor
Red-throated diver	9	Low
Fulmar*	**542.3** ± 657.9	Good
Manx shearwater*	**1,346.8** ±,1,018.7	Moderate
European storm petrel	**336**	Poor
Leach's storm petrel	n/a	Moderate
Gannet	**315.2** ± 194.2	Highest
Cormorant	**25.6** ± 8.3	Moderate
Shag	**13.2** ± 10.5	Highest
Arctic skua	n/a	Poor
Great skua	**443.3** ± 487.9	Uncertain
Black-headed gull	**18.5**	Uncertain
Common gull	**50**	Poor
Mediterranean gull	**20**	Uncertain
Herring gull	**58.8** ± 26.8	Good
Lesser black-backed gull	**127** ± 109	Highest
Kittiwake	**156.1** ± 144.5	Good
Sandwich tern	**34.3** ± 23.2	Moderate
Roseate tern	**12.6** ± 10.6	Moderate
Common tern	**18.0** ± 8.9	Good
Arctic tern	**25.7** ± 14.8	Good
Little tern	**5**	Moderate
Guillemot	**73.2** ± 80.5	Highest
Razorbill	**88.7** ± 75.9	Good
Puffin	**137.1** ± 128.3	Good
* For SCI species with mean-max foraging ranges exceeding 500 km (i.e. Fulmar and Manx Shearwater), a maximum range of 500 km has been applied. Though individual birds may forage in locations at distances exceeding 500 km from more distant breeding SPAs, the abundance of these birds within the very large foraging sites of these species likely to occur within the MUL application area is considered negligible. No route to LSE is concluded as the MUL application area would not constitute a core part of their foraging range.		

In

Table 4-5, the SPAs and SCIs to be included in screening are listed.

Table 4-5 SPAs included in screening.

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)		
Old Head of Kinsale SPA IE004021	68.46 km	**Breeding/Diving** Kittiwake [A188] Guillemot [A199]		
Cork Harbour SPA IE004030	94.38 km	**Breeding** Lesser Black-backed Gull [A183]	**Wintering** Lesser Black-backed Gull [A183]	
Ballycotton Bay SPA IE004022	97.93 km	**Breeding** Lesser Black-backed Gull [A183]	**Wintering** Lesser Black-backed Gull [A183]	
Ballymacoda Bay SPA IE004022	107.08 km	**Breeding** Lesser Black-backed Gull [A183]	**Wintering/Breeding** Lesser Black-backed Gull [A183]	
Helvick Head to Ballyquin SPA IE004192	127.92 km	**Breeding/diving** Kittiwake [A188]		
Beara Peninsula SPA IE004155	120.70 km	**Breeding/Diving** Fulmar [A009]		
The Bull And The Cow Rocks SPA IE004066	130.04 km	**Breeding/Diving** Storm Petrel [A014] Gannet [A016] Puffin [A204]	**Breeding** Gannet [A016] Puffin [A204] Storm Petrel [A014]	**Diving** Gannet [A016] Puffin [A204]
Deenish Island and Scariff Island SPA IE004175	146.08 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013] Storm Petrel [A014]	**Breeding** Fulmar [A009] Manx Shearwater [A013] Storm Petrel [A014]	**Diving** Fulmar [A009] Manx Shearwater [A013]
Isles of Scilly SPA UK9020288	148.78 km	**Breeding** Storm Petrel [A014]		
Skomer, Skokholm and the Seas off Pembrokeshire SPA UK9014051	149.22 km	**Breeding** Storm Petrel [A014]		
Iveragh Peninsula SPA IE004154	152.09 km	**Breeding/Diving** Fulmar [A009] Kittiwake [A188]		

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)		
Seas off Wexford cSPA IE004237	143.08 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013] Gannet [A016] Kittiwake [A188]	**Breeding** Fulmar [A009] Manx Shearwater [A013] Gannet [A016]	**Diving** Fulmar [A009] Manx Shearwater [A013] Gannet [A016]
Skelligs SPA IE004007	159.15 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013] Storm Petrel [A014] Gannet [A016]	**Breeding** Fulmar [A009] Manx Shearwater [A013] Gannet [A016] Storm Petrel [A014]	**Diving** Fulmar [A009] Manx Shearwater [A013] Gannet [A016]
Puffin Island IE004003	160.55 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013] Storm Petrel [A014]	**Breeding** Fulmar [A009] Manx Shearwater [A013] Storm Petrel [A014]	**Diving** Fulmar [A009] Manx Shearwater [A013]
Saltee Islands SPA IE004002	167.93 km	**Breeding/Diving** Fulmar [A009] Gannet [A016]		
Blasket Islands SPA IE004008	186.28 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013] Storm Petrel [A014]	**Breeding** Fulmar [A009] Manx Shearwater [A013] Storm Petrel [A014]	**Diving** Fulmar [A009] Manx Shearwater [A013]
Dingle Peninsula IE004153	190.87 km	**Breeding/Diving** Fulmar [A009]		
Grassholm SPA UK9014041	204.01 km	**Breeding/Diving** Gannet [A016]		
Mers Celtiques – Talus du golfe de Gascogne SPA FR5212016	216.33 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013] Gannet [A016] Storm Petrel [A014] Great Skua	**Breeding** Fulmar [A009] Manx Shearwater [A013] Gannet [A016] Storm Petrel [A014]	**Diving** Fulmar [A009] Manx Shearwater [A013] Gannet [A016]
Magharee Islands SPA IE004125	232.38 km	**Breeding**		

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)		
		Storm Petrel [A014]]		
Kerry Head SPA IE004189	244.87 km	**Breeding/Diving** Fulmar [A009]		
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA UK9013121	297.44km	**Breeding/Diving** Manx Shearwater [A013]		
Cliffs of Moher SPA IE004005	307.85 km	**Breeding/Diving** Fulmar [A009]		
Ouessant-Molène SPA FR5310072	322.17 km	**Breeding/Diving** Storm Petrel [A014] Fulmar [A009] Manx Shearwater [A013] Great Skua	**Breeding** Storm Petrel [A014] Fulmar [A009] Manx Shearwater [A013]	**Diving** Fulmar [A009] Manx Shearwater [A013]
Lambay Island SPA IE004069	344.74 km	**Breeding/Diving** Fulmar [A009]		
Cruagh Island SPA IE004170	350.12 km	**Breeding/Diving** Manx Shearwater [A013]		
High Island, Inishshark and Davillaun SPA IE004144	352.27 km	**Breeding/Diving** Fulmar [A009]		
Baie de Morlaix SPA FR5310073	363.09 km	**Breeding/Diving** Manx Shearwater [A013]		
Côte de Granit Rose-Sept Iles FR5310011	365.76 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013]		
Camaret SPA FR5312004	368.78 km	**Breeding/Diving** Fulmar [A009]		
North-West Irish Sea SPA IE004236	366.86 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013]		
Irish Sea Front SPA UK9020328	366.94 km	**Breeding/Diving** Manx Shearwater [A013]		

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)		
Nord Bretagne DO SPA FR2512005	380.46 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013] Great Skua European Storm Petrel	**Breeding** Fulmar [A009] Manx Shearwater [A013]	**Diving** Fulmar [A009] Manx Shearwater [A013]
Clare Island SPA IE004136	382.37 km	**Breeding/Diving** Fulmar [A009]		
Cap Sizun SPA FR5310055	386.11 km	**Breeding/Diving** Fulmar [A009]		
Tregor Goëlo SPA FR5310055	390.64 km	**Breeding/Diving** Fulmar [A009]		
Duvillaun Islands SPA IE00004111	412.26 km	**Breeding/Diving** Fulmar [A009]		
Roches de Penmarc'h SPA FR5312009	412.31 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013]		
Archipel de Glenan SPA FR5310057	442.92 km	**Breeding/Diving** Manx Shearwater [A013]		
Dunes et côtes de Trévignon SPA FR5312010	455.84 km	**Breeding/Diving** Manx Shearwater [A013]		
Cap d'Erquy-Cap Fréhel SPA FR5310095	460.61 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013]		
Chausey SPA FR2510037	484.31 km	**Breeding/Diving** Manx Shearwater [A013]		

4.2.2 ANNEX I BENTHIC HABITATS

All site investigation activities are located outside of Natura 2000 sites designated for Annex I habitat QIs and no source-pathway-receptor (S-P-R) connection has been identified, therefore there will be **no direct effect** on any designated Annex I habitat QIs within Natura 2000 sites. Therefore, there is no overlap between the proposed Maritime Usage Licence area and any SACs designated for the protection of the Qualifying Interest Annex I Habitats.

4.2.3 ANNEX II SPECIES

The following section includes the identification of relevant SACs as associated with their Annex II marine mobile species; marine mammals and anadromous fish. The activities are within the offshore marine environment and there is no S-P-R for otter.

4.2.3.1 MARINE MAMMALS

Annex II marine mammals of the Habitats Directive (Council Directive 92/43/EEC) that are present in the Celtic Sea include:

- Cetaceans; and
    - Bottle-nose Dolphin (*Tursiops truncatus*)
    - Harbour Porpoise (*Phocoena phocoena*)
- Pinnipeds;
    - Grey Seal (*Halichoerus grypus*)
    - Common (Harbour) Seal (*Phoca vitulina*)

*Note for pinnipeds, grey and common seals, a certain amount of time is spent hauled-out on land to rest, moult and pup. Once the breeding season is completed, most Grey Seals leave the haul-out sites after 2 to 3 weeks once their pups have fully moulted their white lanugo coat. The use of a particular SAC for pupping is very time and location specific.

The newly available data on grey and common seal movements (Carter *et* al., 2022) provide SAC-specific estimates of at-sea distribution for use in marine spatial planning, demonstrating that hotspots of at-sea density in UK and Ireland-wide maps cannot always be apportioned to the nearest SAC.

Table 4-6 below summarises the ZoI for Marine Mammals and the management units are shown on Figure 4-8 and Figure 4-9.

Table 4-6 Migratory species with a marine element for which SACs have been designated in Ireland and UK

Marine Species			Comments
1349	Bottlenose dolphin	*Tursiops truncatus*	Management units for harbour porpoise and bottlenose dolphin have been used to determine relevant sites depending on the Qualifying Interests
1351	Harbour porpoise	*Phocoena phocoena*	
1364	Grey seal	*Halichoerus grypus*	Foraging distances of 448 km for grey seals (from Carter et al, 2022),
1365	Common (Harbour) seal	*Phoca vitulina*	Foraging distances of 273 km for harbour seals (from Carter et al, 2022),

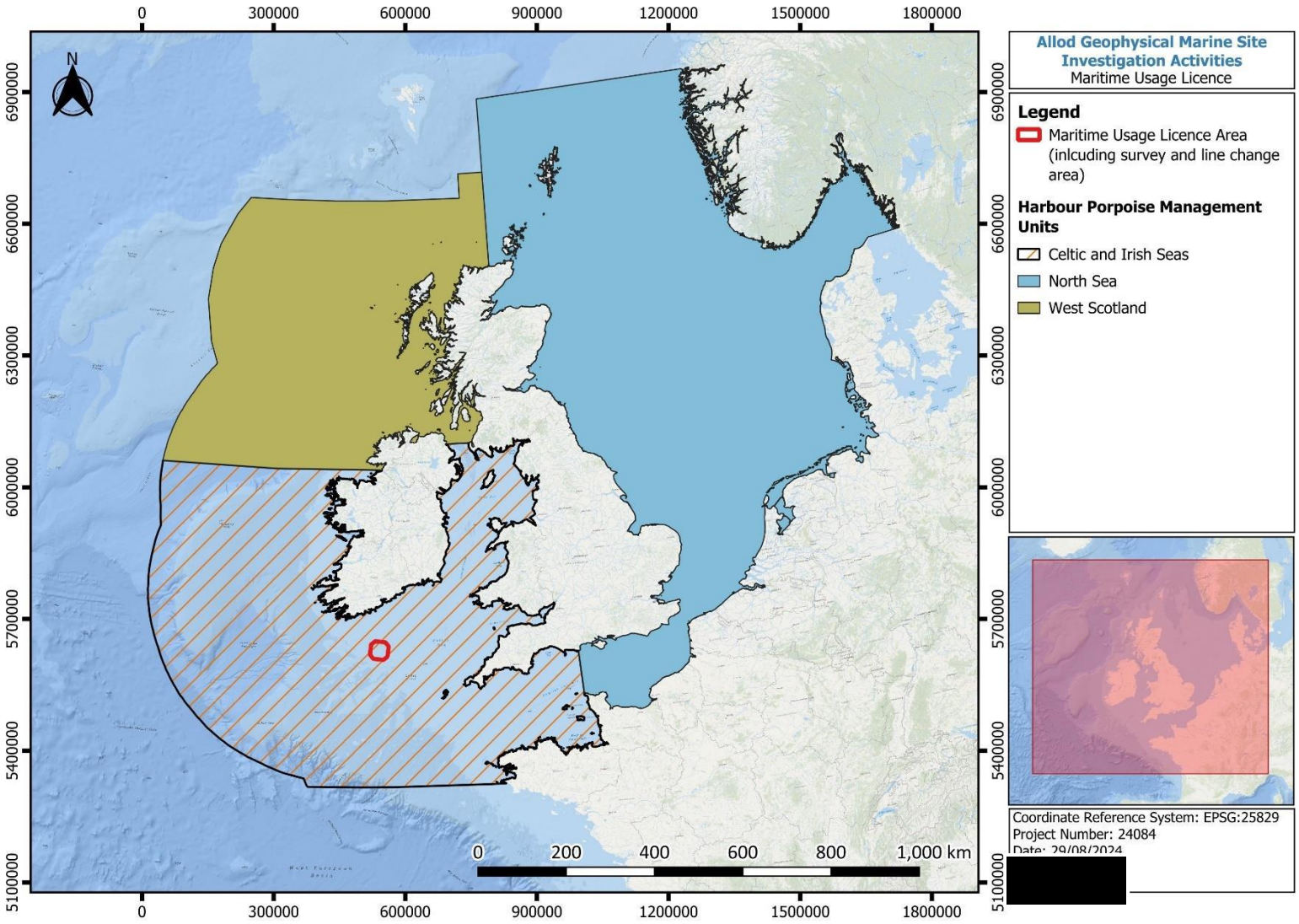

Figure 4-8 Harbour Porpoise Management Units (JNCC, 2023 Management Units)

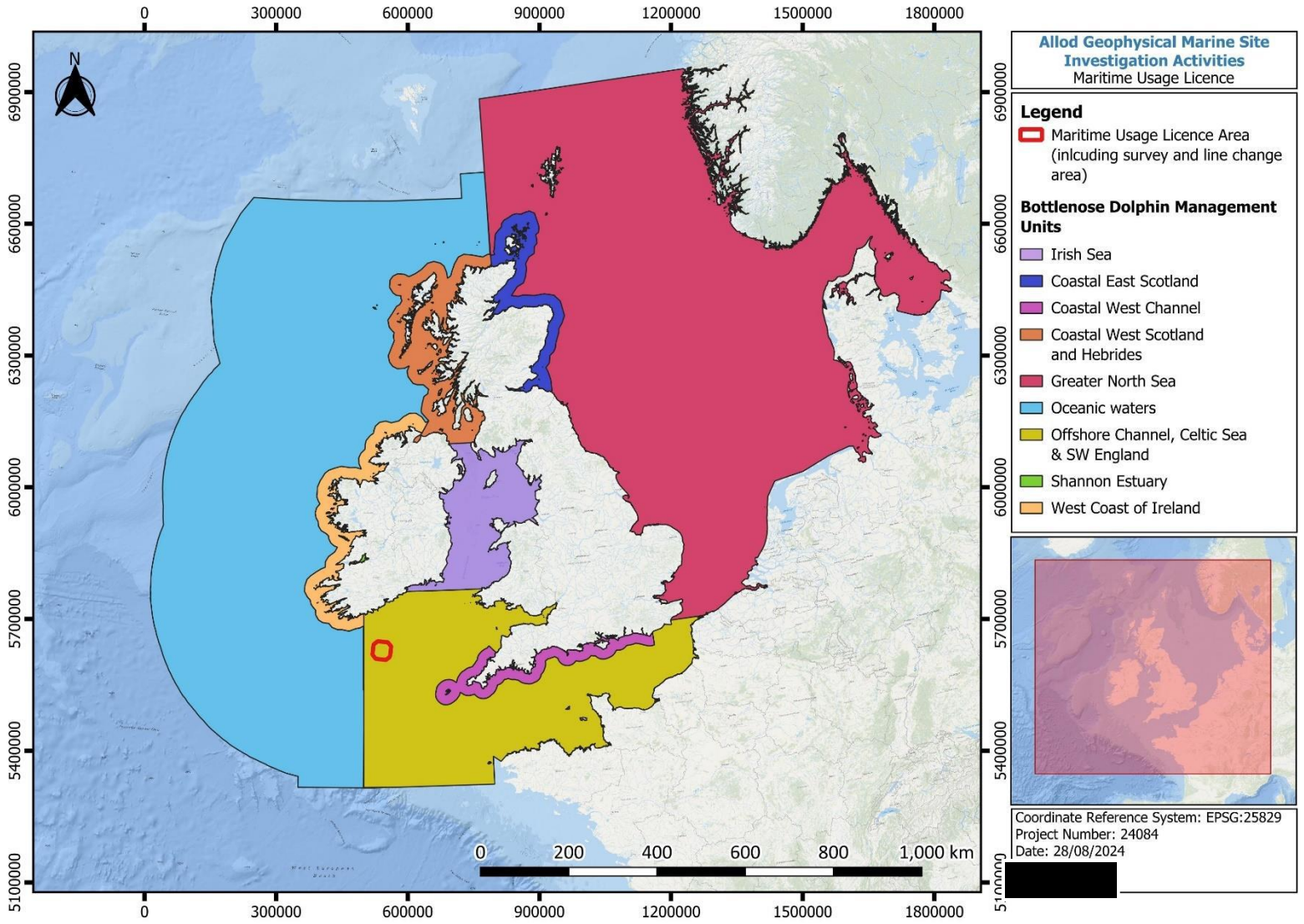

Figure 4-9 Bottlenose Dolphin Management Units (JNCC, 2023)

In Table 4-7, the SACs with Annex II species as QIs that are considered to have potential for connectivity are listed.

Table 4-7 SACs included in screening

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs
000101	Roaringwater Bay and Islands SAC	77.39	Grey Seal *(Halichoerus grypus)* [1364] Harbour Porpoise *(Phocoena phocoena)* [1351]
002158	Kenmare River SAC	126.51	Harbour Porpoise *(Phocoena phocoena)* [1351] Grey Seal *(Halichoerus grypus)* [1364]
000090	Glengarriff Harbour and Woodland SAC	139.24	Harbour Seal (*Phoca vitulina*) [1365]
000764	Hook Head SAC	154.52	Harbour Porpoise *(Phocoena phocoena)* [1351] Bottlenose Dolphin (*Tursiops truncatus*) [1349]
000707	Saltee Islands SAC	161.29	Grey Seal *(Halichoerus grypus)* [1364]
002172	Blasket Islands SAC	182.59	Harbour Porpoise *(Phocoena phocoena)* [1351] Grey Seal *(Halichoerus grypus)* [1364]
002269	Carnsore Point SAC	179.14	Harbour Porpoise *(Phocoena phocoena)* [1351]
002953	Blackwater Bank SAC	212.42	Harbour Porpoise *(Phocoena phocoena)* [1351]
000781	Slaney River Valley SAC	214.77	Harbour Seal (*Phoca vitulina*) [1365]
002327	Belgica Mound Province SAC	232.07	Harbour Porpoise *(Phocoena phocoena)* [1351]
003000	Rockabill to Dalkey Island SAC	308.90	Harbour Porpoise *(Phocoena phocoena)* [1351]
000213	Inishmore Island SAC	313.65	Harbour Porpoise *(Phocoena phocoena)* [1351]
003015	Codling Fault Zone SAC	319.18	Harbour Porpoise *(Phocoena phocoena)* [1351]
000328	Slyne Head Islands SAC	336.17	Grey Seal *(Halichoerus grypus)* [1364]
000204	Lambay Island SAC	335.31	Grey Seal *(Halichoerus grypus)* [1364] Harbour Porpoise *(Phocoena phocoena)* [1351]
000278	Inishbofin and Inishark SAC	358.04	Grey Seal *(Halichoerus grypus)* [1364]
000495	Duvillaun Islands SAC	412.26	Grey Seal *(Halichoerus grypus)* [1364]
000507	Inishkea Islands SAC	414.07	Grey Seal *(Halichoerus grypus)* [1364]
002998	West Connacht Coast SAC	429.21	Harbour Porpoise *(Phocoena phocoena)* [1351]
UK SAC Annex II			
UK0013694	Isles of Scilly Complex	141.56	Grey Seal *(Halichoerus grypus)* [1364]

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs
UK0030396	Bristol Channel Approaches / Dynesfeydd Môr Hafren	191.45	Harbour Porpoise *(Phocoena phocoena)* [1351]
UK0013116	Pembrokeshire Marine/ Sir Benfro Forol	185.33	Grey Seal *(Halichoerus grypus)* [1364]
UK0013114	Lundy	241.31	Grey Seal *(Halichoerus grypus)* [1364]
UK0030397	West Wales Marine / Gorllewin Cymru Forol	252.26	Harbour Porpoise *(Phocoena phocoena)* [1351]
UK0030398	North Anglesey Marine / Gogledd Môn Forol	335.49	Harbour Porpoise *(Phocoena phocoena)* [1351]
UK0030399	North Channel	417.04	Harbour Porpoise *(Phocoena phocoena)* [1351]
France SAC Annex II			
FR5302015	Mers Celtiques - Talus du golfe de Gascogne	217.56	Harbour Porpoise *(Phocoena phocoena)* [1351] Bottlenose Dolphin (*Tursiops truncatus*) [1349]
FR5302016	Récifs du talus du golfe de Gascogne	263.42	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR2502022	Nord Bretagne DH	321.38	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5300018	Ouessant-Molène	322.17	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5300017	Abers - Côte des légendes	335.19	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5302007	Chaussée de Sein	355.82	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5300015	Baie de Morlaix	363.09	Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5300009	Côte de Granit rose-Sept-Iles	365.76	Bottlenose Dolphin (*Tursiops truncatus*) [1349]

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs
			Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5302006	Côtes de Crozon	367.24	Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5300010	Tregor Goëlo	390.64	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR2500084	Récifs et landes de la Hague	457.14	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR2502019	Anse de Vauville	458.44	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5300011	Cap d'Erquy-Cap Fréhel	459.44	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5300066	Baie de Saint-Brieuc - Est	459.19	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR2502018	Banc et récifs de Surtainville	462.50	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR5300012	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard	482.24	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR2500079	Chausey	484.31	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]
FR2500085	Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire	492.95	Bottlenose Dolphin (*Tursiops truncatus*) [1349]
FR5300061	Estuaire de la Rance	499.55	Harbour Porpoise *(Phocoena phocoena)* [1351]

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs
FR2500077	Baie du Mont Saint-Michel	512.97	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]
FR2502020	Baie de Seine occidentale	521.62	Bottlenose Dolphin (*Tursiops truncatus*) [1349]
FR2502021	Baie de Seine orientale	583.34	Bottlenose Dolphin (*Tursiops truncatus*) [1349]
FR2300139	Littoral Cauchois	694.85	Bottlenose Dolphin (*Tursiops truncatus*) [1349]
FR2200346	Estuaires et littoral picards (baies de Somme et d'Authie)	697.77	Bottlenose Dolphin (*Tursiops truncatus*) [1349]
FR3100478	Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant	717.51	Bottlenose Dolphin (*Tursiops truncatus*) [1349]

4.2.3.2 ANNEX II ANADROMOUS FISH

The following anadromous fish species are listed under Annex II of the Habitats Directive (Council Directive 92/43/EEC), which means that they are 'animal and plant species of community interest whose conservation requires the designation of special areas of conservation (SACs)':

- Twaite shad (*Alosa fallax*) [1103];
- Allis shad (*Alosa alosa*) [1102];
- Atlantic salmon (*Salmo salar*) [1106];
- Sea lamprey (*Petromyzon marinus*) [1095];
- River lamprey (*Lampetra fluviatilis*) [1099]; and
- Freshwater Pearl Mussel (FWPM) (*Margaritifera margaritifera*) [1029] *

* Not an anadromous fish, however, this species has a symbiotic relationship with the anadromous fish, Atlantic Salmon.

There are a number of SAC rivers designated for Annex II migratory fish on the coast of Ireland. Although these SAC rivers are not within the marine environment, the above-mentioned designated fish have a marine phase of their life cycle, relying on the sea to migrate to foraging grounds before returning to freshwater river systems to spawn. As such, there is a potential for these species to be within the MUL application area. There was considered to be potential connectivity with the SAC if the MUL application area overlapped the potential migration routes of any Annex II anadromous fish QIs.

Atlantic Salmon

In a recent acoustic telemetry study on Atlantic salmon smolts from in the Irish Sea and their migratory trajectory, it was revealed/found that Atlantic salmon smolts leaving rivers along the northeast coast of Ireland undertook a northerly migration out of the Irish Sea through the North Channel into deeper offshore waters further north (Barry *et al*., 2020). In addition, Atlantic salmon from SACs in Wales are also considered to migrate along prevailing currents north (Cefas, 2024) and the migratory route is unlikely to pass directly through Irish coastal waters. In another study, it was shown that salmon, migrating from southeast Ireland, and northwest Spain primarily migrated westward towards oceanographic fronts, out to the shelf edge before crossing the North Atlantic onto East Greenland for feeding (Rikardsen, *et al.,* 2021) – see Figure 4-10. The zone of influence for Atlantic Salmon was therefore considered to be rivers on the southern Irish seaboard**.**

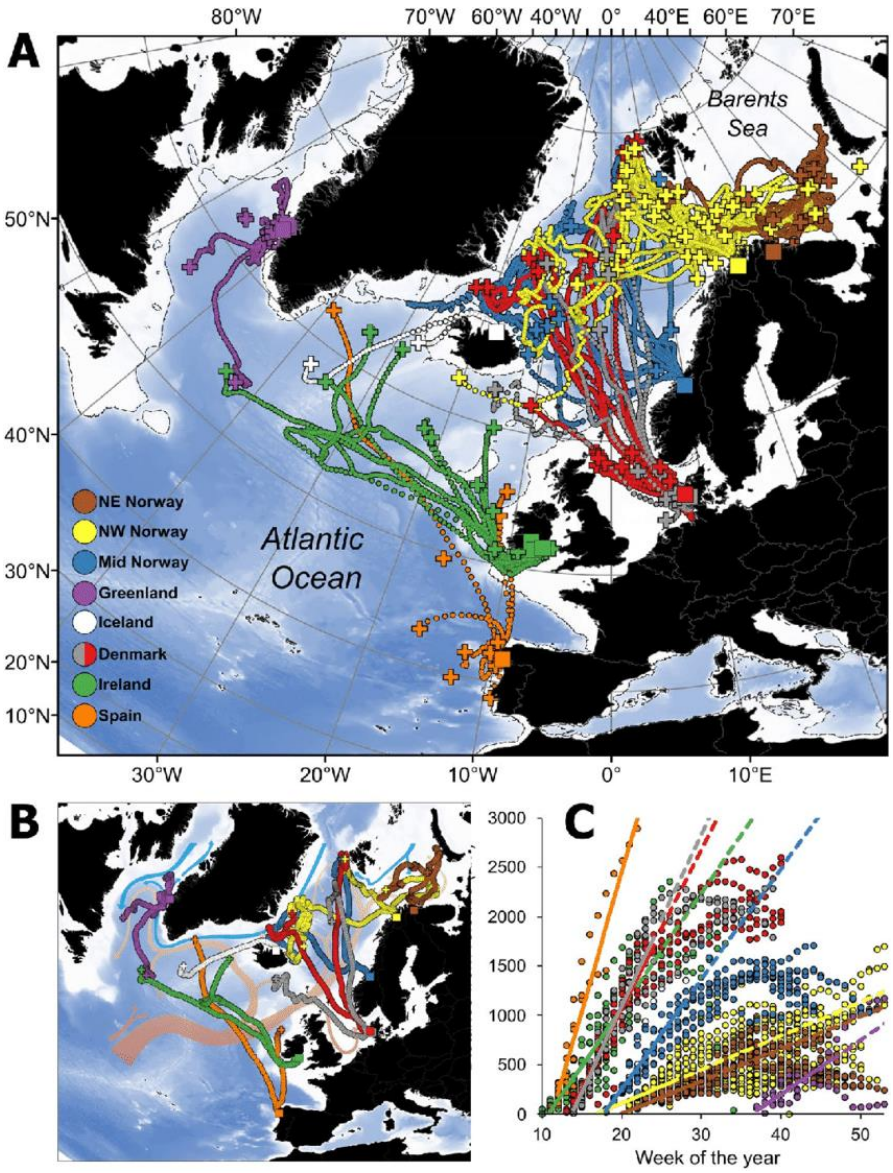

Figure 4-10 Migrations of Atlantic salmon tagged in eight different geographic areas (Rikardsen, *et al.*, 2021).

Freshwater Pearl Mussel

As noted above in Section 3,4,2, the freshwater pearl mussel (FWPM), although not an anadromous species, remaining in freshwater rivers for the entirety of their life cycle, do rely on their symbiotic relationship with Atlantic salmon (and brown trout) for a specific stage within their life-cycle. Therefore, it is considered that the assessment of FWPM is part of the assessment of impacts to Atlantic Salmon.

Lamprey Species

As river and sea lamprey rely on their parasitic relationship with Atlantic salmon and shad species, the same logic for FWPM was applied to lamprey. Therefore, the ZoI for these species includes the assessment of impacts to their annexed hosts, Atlantic salmon and shad species**.** River lamprey are

known to generally remain in the transitional waters of major estuaries, some near coastal habitats also utilised. They migrate from their coastal feeding grounds into freshwater to spawn. A precautionary approach to the identification of relevant European sites has been applied; a 35 km foraging distance has been applied, based on JNCC (2019), for sea and river lamprey.

Shad Species

Twaite Shad are iteroparous (multiannual spawners) and possibly philopatric (homing to natal rivers to spawn) (King and Roche, 2008). Allis shad is native to Ireland and occur in very low numbers in coastal waters and estuaries in the southeast. The requirements of shads at sea are very poorly understood, but they appear to be mainly coastal and pelagic in habit. Allis shad have been reported from depths of 10–150 m, and twaite from depths of 10–110 m, with a preference for water 10–20 m deep but have been found in deeper waters (Maitland and Hatton-Ellis, 2003, and references therein). Very little is known about the distribution and movements of shad during their marine life-phase. There are no recent records of spawning populations in Ireland (IFI, species information, accessed online 2024). In a recent study, the movement of 58 acoustic-tagged Twaite Shad emigrating from the River Severn (western England) were recorded. One of the tagged Twaite Shad was detected in the Munster Blackwater Estuary (Ireland) and then in the River Severn, indicating a minimum movement distance of 950 km (Davies, *et al.,* 2020). However, given the spatial footprint of the site investigation activities and temporal nature of the proposed works, connectivity with the MUL application area and more distant SACs designated for shad species are not likely to be connected and are considered too far from the MUL application area for any significant interaction to occur. The same approach was taken when considering the ZoI for SACs designated for lamprey species – precautionary 35 km foraging distance has been applied, based on JNCC, 2019.

Given known factors relating to the species such as migratory routes, marine spatial distribution and preferred water depths, the European sites were pre-screened for consideration. Where sites also have Annex I Habitats and other Annex II species (i.e. marine mammals and otter, etc.) as Qualifying Interests (QIs), they have been considered in Sections 3.3 and 3.4 respectively.

The pre-screening process for the European sites considering the Annex II migratory fish QIs concluded all sites were outside the ZoI precautionary distance of 35 km, there is no potential for connectivity and, so would not be considered further in the assessment.

4.2.4 SUMMARY

In total, **95 Natura 2000** sites were identified as being in the zone of influence of the Application area and deemed relevant for screening in Section 4.3.

The **44** SPAs and their SCIs, including the North-west Irish Sea cSPA and the Seas off Wexford cSPA, which have been included for screening are summarised in Table 4-8. The **51** SACs are provided in Table 4-7 and discussed in more detail in Section 4.3.2 below.

For SACs, only the designated migratory QIs in the zone of influence of the proposed activities (as defined for the relevant species above) are considered. Annex I Habitats or other Annex II species are therefore not included in Table 4-6 and Table 4-7 or considered in further screening.

For UK and French SPAs only the designated SCIs within the zone of influence are considered as defined

- Table 4-5.
- The North-West Irish Sea candidate SPA, announced in July 2023, has been included in this assessment.
- The Seas of Wexford candidate SPA, announced in January 2024, has been included in this assessment.

4.3 SCREENING ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS (LSE)

4.3.1 MARINE ORNITHOLOGY

This section considers the potential for LSE on marine ornithology features of the SPAs within the ZoI (Table 4-8). SPAs are proposed to be screened in where LSE cannot be ruled out for one or more SCIs, for one or more routes to impact. SPAs are screened out where there are no LSE to the SCIs. A rationale is given for each SPA for each SCI and route to impact to explain the screening decision.

Table 4-8 Screening of SPAs and all SCIs 15 km to 500 km of the MUL application area

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
Old Head of Kinsale SPA IE004021	68.46 km	**Breeding/Diving** Kittiwake [A188] Guillemot [A199]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is unlikely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Cork Harbour SPA IE004030	94.38 km	**Wintering** Lesser Black-backed Gull [A183]	Above - water noise Visual impacts	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely.
Ballycotton on Bay SPA IE004022	97.93 km	**Wintering** Lesser Black-backed Gull [A183]	Above - water noise Visual impacts	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely.

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
Ballymacoda Bay SPA IE004022	107.08 km	**Wintering/Breeding** Lesser Black-backed Gull [A183]	Above - water noise Visual impacts	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely.
Helvick Head to Ballyquin SPA IE004192	127.92 km	**Breeding/Diving** Kittiwake [A188]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Beara Peninsula SPA IE004155	120.70 km	**Breeding/Diving** Fulmar [A009]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
					escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
The Bull And The Cow Rocks SPA IE004066	130.04 km	**Breeding** Gannet [A016] Puffin [A204] Storm Petrel [A014] **Diving** Gannet [A016] Puffin [A204]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Deenish Island and Scariff Island SPA IE004175	146.08 km	**Breeding** Fulmar [A009] Manx Shearwater [A013] Storm Petrel [A014]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
		Diving Fulmar [A009] Manx Shearwater [A013]			Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Isles of Scilly SPA UK9020288	148.78 km	**Breeding** Storm Petrel [A014]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Skomer, Skokholm and the Seas off Pembrokeshire SPA	149.22 km	**Breeding** Storm Petrel [A014]	Above - water noise Visual impacts	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
UK9014051					Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Iveragh Peninsula SPA IE004154	152.09 km	**Breeding/Diving** Fulmar [A009] Kittiwake [A188]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Seas off Wexford cSPA IE004237	143.08 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013] Gannet [A016] Kittiwake [A188]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
					foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Skelligs SPA IE004007	159.15 km	**Breeding** Fulmar [A009] Manx Shearwater [A013] Gannet [A016] Storm Petrel [A014] **Diving** Fulmar [A009] Manx Shearwater [A013] Gannet [A016]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Puffin Island IE004003	160.55 km	**Breeding** Fulmar [A009] Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
		Storm Petrel [A014] **Diving** Fulmar [A009] Manx Shearwater [A013]			escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Saltee Islands SPA IE004002	167.93 km	**Breeding** Fulmar [A009] Gannet [A016] **Diving** Fulmar [A009] Gannet [A016	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Blasket Islands SPA IE004008	186.28 km	**Breeding** Fulmar [A009] Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
		Storm Petrel [A014] **Diving** Fulmar [A009] Manx Shearwater [A013]			escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Dingle Peninsula IE004153	190.87 km	**Breeding/Diving** Fulmar [A009]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Grassholm SPA UK9014041	204.01 km	**Breeding/Diving** Gannet [A016]	Above - water noise Visual impacts	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely.

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
			Underwater noise		Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Mers Celtiques – Talus du golfe de Gascogne SPA FR5212016	216.33 km	**Breeding** Fulmar [A009] Manx Shearwater [A013] Gannet [A016] Storm Petrel [A014] **Diving** Fulmar [A009] Manx Shearwater [A013] Gannet [A016]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
Maghare e Islands SPA IE004125	232.38 km	**Breeding** Storm Petrel [A014]	Above - water noise Visual impacts	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Kerry Head SPA IE004189	244.87 km	**Breeding/Diving** Fulmar [A009]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA UK9013121	297.44 km	**Breeding/Diving** Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Cliffs of Moher SPA IE004005	307.85 km	**Breeding/Diving** Fulmar [A009]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
Ouessant -Molène SPA FR5310072	322.17 km	**Breeding** Storm Petrel [A014] Fulmar [A009] Manx Shearwater [A013] **Diving** Fulmar [A009] Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Lambay Island SPA IE004069	344.74 km	**Breeding/Diving** Fulmar [A009]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
					considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Cruagh Island SPA IE004170	350.12 km	**Breeding/Diving** Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
High Island, Inishshark and Davillaun SPA IE004144	352.27 km	**Breeding/Diving** Fulmar [A009]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
					considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Baie de Morlaix SPA FR5310073	363.09 km	**Breeding/Diving** Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Côte de Granit Rose-Sept Iles FR5310011	365.76 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
					considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Camaret SPA FR5312004	368.78 km	**Breeding/Diving** Fulmar [A009]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
North-West Irish Sea SPA IE004236	366.86 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
					considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Irish Sea Front SPA UK9020328	366.94 km	**Breeding/Diving** Manx Shearwater [A013]	Above - water noise Visual impacts Underwater noise	Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely. Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Nord Bretagne DO SPA FR2512005	380.46 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013]			
Clare Island SPA IE004136	382.37 km	**Breeding/Diving** Fulmar [A009]			
Cap Sizun SPA	386.11 km	**Breeding/Diving** Fulmar [A009]		Out	The physical presence of vessels, in the immediate vicinity the SPA will be low magnitude and short in duration. Significant effects are considered unlikely.

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
FR5310055				Out	Underwater noise is likely to cause disturbance to diving seabirds, either directly as a deterrence causing displacement from habitat or evoking an escape flight response, or indirectly affecting prey acquisition. Special Conservation Interests (SCIs) designated for SPAs whose predominant foraging method is shallow diving, dip diving or surface/skim feeders are considered unlikely to be impacted by underwater noise due to the brevity of exposure time and disturbance sensitivity.
Tregor Goëlo SPA FR5310055	390.64 km	**Breeding/Diving** Fulmar [A009]			
Duvillaun Islands SPA IE0000411	412.26 km	**Breeding/Diving** Fulmar [A009]			
Roches de Penmarc'h SPA FR5312009	412.31 km	**Breeding/Diving** Fulmar [A009] Manx Shearwater [A013]			
Archipel de Glenan SPA	442.92 km	**Breeding/Diving**			

SPA Site name and code	By sea distance from MUL Area (km)	Special Conservation Interest (SCI)	Potential Source of Impact	Screened In/Out	Justification
FR5310057		Manx Shearwater [A013]			
Dunes et côtes de Trévignon SPA FR5312010	455.84 km	**Breeding/Diving** Manx Shearwater [A013]			
Cap d'Erquy-Cap Fréhel SPA FR5310095	460.61 km	**Breeding/Diving** Manx Shearwater [A013] Fulmar [A009]			
Chausey SPA FR2510037	484.31 km	**Breeding/Diving** Manx Shearwater [A013]			

4.3.2 ANNEX II SPECIES

4.3.2.1 MARINE MAMMALS

Disturbance from Vibration and Underwater noise associated with surveys

Comparing the data on species auditory band with (Table 3-5) and the noise characteristics of the surveys (Table 3-6) it is deemed that the following will be audible to marine mammals:

- Airgun array systems may emit noise in an audible frequency for marine mammals which could cause TTS and PTS according to the injury criteria proposed by Southall *et al*. 2019.
- Depending on what frequency is used, the Sub Bottom Profiler (Parametric Pinger) may emit noise in an audible frequency for marine mammals which can reach a Sound Pressure Level which could cause TTS and PTS injury according to the SPL injury criteria proposed by Southall *et al.* 2019.
- Sparker and Boomer SBP, Parametric Pinger systems may emit noise in an audible frequency for marine mammals which could cause TTS injury to seals according to the SPL injury criteria proposed by Southall *et al.* 2019.
- Side Scan Sonar may emit noise in an audible frequency for marine mammals and seals which could cause TTS and/or PTS according to the SPL injury criteria proposed by Southall *et al.* 2019.
- USBL may emit noise at an audible frequency for marine mammals, which could cause TTS/PTS injury according to the SPL injury criteria proposed by Southall et al., 2019.
- None of the other proposed site investigation activities emit noise in an audible frequency for marine mammals which can reach a Sound Pressure Level which could cause lethal effects or physical injury to marine mammals.

Table 4-9 provides the noise sources during site investigation activities and Table 4-10 provides a summary of the noise sources and audible activities for each of the hearing groups outlined in section 3.4.1 above.

Table 4-9 Noise sources during site investigation activities

Survey technique	Operating frequency (kHz)	Sound pressure level (SPL_{PEAK}) (dB re 1µPa @1m)	Sound Exposure Level (SEL_{PEAK} (unweighted); dB re $1\mu Pa^{-2}s$)	Source/ Reference
Impulsive				
Airgun Array (2000 psi, 4500 in^3)	0.005 - 0.3	230–260		Multiple GI-Source or other airguns (Duffy *et al*., 2023; Hildebrand, 2009)
Multi-beam Echosounder (MBES) (<200m)	170 - 700	198 - 228		Sonic 2024-V or the Kongsberg EM2040 MKII (Kongsberg, 2024a; R2Sonic, 2024)
Side Scan Sonar (SSS)	500-900 (high)	196 - 224		L3 Klein 5000, Egetech 4200 (Duffy *et al*., 2023; Ruppel *et al.*, 2022)
Sub Bottom Profiler	1 - 115	206 - 247		TOPAS, Innomar systems (Ruppel *et al.*, 2022)

Survey technique	Operating frequency (kHz)	Sound pressure level (SPL_{PEAK}) (dB re 1µPa @1m)	Sound Exposure Level (SEL_{PEAK} (unweighted); dB re $1\mu Pa^{-2}s$)	Source/ Reference
(Parametric Pinger)				
Sub Bottom Profiler (Sparker)	0.3 – 1.4	185 - 226		Applied Acoustics Delta Sparker, SIG ELC sparker (Duffy *et al*., 2023; Ruppel *et al*., 2022)
Sub Bottom Profiler (Boomer)	0.3 - 3	185 - 207		Applied Acoustics S-boom (Duffy *et al*., 2023; Ruppel *et al*., 2022)
USBL (Ultra Short Baseline)	18-32 kHz	192 - 207		Kongsberg HiPAP, Applied Acoustics EasyTrak Nexus Model EZT-2691 (Applied Acoustics, 2024; Kongsberg, 2024b)
Vessel noise	0.05 – 0.3	N/A	150 – 175	Southall *et al*., 2007

Table 4-10 Marine mammal species auditory band width and relevant audible survey activities

Hearing Frequency Group	Estimated Auditory Band Width (kHz)	Audible Survey	Surveys inducing PTS and/or TTS
Low Frequency Cetaceans Baleen whales (Minke whale, Humpback whale)	0.007 – 35	SBP (Sparker) SBP (Boomer) USBL Vessel Noise Airgun Array	SBP (Sparker) Airgun Array
Mid Frequency cetaceans Most toothed whales and dolphins (including Common & Risso's Dolphin)	0.15 - 160	SBP (Parametric Pinger) SBP (Sparker) SBP (Boomer) USBL Vessel Noise SSS Airgun Array	SSS SBP (Parametric Pinger) SBP (Sparker) Airgun Array
High frequency	0.2 - 180	SBP (Parametric Pinger) SBP (Sparker)	SSS SBP (Parametric Pinger)

Hearing Frequency Group	Estimated Auditory Band Width (kHz)	Audible Survey	Surveys inducing PTS and/or TTS
Certain toothed whales and porpoises (including Harbour porpoise)		SBP (Boomer) USBL Vessel Noise SSS Airgun Array	SBP (Sparker) SBP (Boomer) USBL Airgun Array
Phocids carnivores in water (PCW) Grey seal & harbour seal	0.05 - 86	SBP (Parametric Pinger) SBP (Sparker) SBP (Boomer) USBL Airgun Array Vessel Noise SSS	SSS SBP (Sparker) Airgun Array
Very Low Frequency Leatherback turtle	0.05 – 1.2	SBP (Sparker) SBP (Boomer) USBL Airgun Array Vessel Noise	Airgun Array

Potential effects from underwater noise may occur for marine mammal species where peak sound levels are greater than 240 dB re 1 µPa, (lethal effects) and where peak sound levels exceed 220 dB re 1 µPa (physical injury). These thresholds provide critical benchmarks for assessing the potential harm to marine organisms. The threshold for physical injury is 220 dB re 1 µPa (Parvin et al., 2007), indicating potential injury at close range if the equipment's upper source levels are reached (Table 3-6).

High-frequency sounds from equipment such as MBES (Multi-Beam Echo Sounders) and SSS (Side Scan Sonar) are likely to attenuate quickly in shallower waters (<200 m; JNCC, 2017). Additionally, the presence of survey vessels in the area is likely to cause small-scale, temporary displacement of cetaceans, keeping them a sufficient distance from the survey equipment to avoid physical injury.

Sound from lower frequency equipment such as the SBPs, Airgun Arrays and USBL (Ultra Short Baseline) are less likely to attenuate quickly in shallower waters, and so has the potential to induce injury at very close range. The SBP, USBL and airgun arrays survey equipment generates noise of sufficiently high power and low frequency which could potentially cause PTS and/or TTS in individuals near the noise source.

The airgun arrays peak sound level at 260dB is above the threshold for the onset of PTS for marine mammals that could be in close proximity to the sound source and so has the potential to induce PTS and cause injury to marine organisms.

As significant effects on designated marine mammal species features of Natura 2000 sites due to underwater noise emitted by some of the proposed site investigation activities are therefore determined to be **likely**, this will be considered further in this assessment, **screening in**.

Injury due to collision (survey vessels and equipment)

The key factors contributing to collision between marine mammals and vessels are the presence of both in the same area and vessel speed (see Schoeman et al., 2020 for review). Injuries to marine mammals from vessel strikes are species-dependent but generally are more severe at higher impact speeds (Wang et al., 2007). Vessels involved in these surveys are likely to be either stationary or travelling slowly (c. 5 knots) thus allowing any animal in the area time to avoid collision.

Cetacean and pinnipeds in the area are exposed to vessels of all sizes on a regular basis due to other activities in the area including fishing and shipping. As a result, they are likely to maintain a distance from all survey vessels for the short time period of site investigation activities before returning to the area once site investigation activities have finished. Therefore, the collision risk posed by the site investigation activities is likely to be significantly lower than that posed by commercial shipping activity. A slow-moving survey vessel in the area will not pose a collision risk to seabirds foraging the area who are accustomed to vessels traversing the area.

Significant effects on designated marine mammal species features of Natura 2000 sites due to collision with vessels undertaking the proposed site investigation activities are considered highly **unlikely, screened Out**.

Pollution Event

Marine mammals are considered vulnerable to oil pollution, in particular given the time they spend resting on the water surface, and diving through it in search of food.

The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/785), is an international marine environmental convention which aims to prevent both operational and accidental discharge into the marine from sea going vessels. Ireland ratified the various elements of the MARPOL Convention through the Sea Pollution Act 1991, the Sea Pollution (Amendment) Act 1999 and the Sea Pollution (Miscellaneous Provisions) Act 2006. MARPOL 73/78 was given further legal effect through Statutory Instruments introduced under these Acts. The Acts place a legal obligation upon operators of vessels to implement measures to prevent both operational and accidental discharges from ships of substances, which may damage the marine environment as well as human health.

While the site investigation activities will result in a temporary increase in vessels using the area which increases the risk of accidents and resultant fuel and/or oil spills, an incidence of pollution whether

from an accidental occurrence or operational activities is not considered likely considering the legal obligations to comply with MARPOL 73/78 with the increased risk of a pollution event occurring due to these activities considered minimal and not to be over and above existing background risk.

All vessels used during the survey campaign shall, as required by law, be MARPOL Compliant and fully certified by the Maritime Safety Office. This is standard practice for all survey activities irrespective of the survey operator and as it is required by law is built into the survey design.

In relation to vessel refueling at sea, strict protocols including the use of specialized equipment to minimize the risk of spills or leaks. All refueling operations will be supervised by experienced personnel and carried out in favourable weather conditions to reduce the potential for accidents. Additionally, an emergency response plan will be in place. These measures are designed to safeguard the marine environment.

Therefore, it is considered unlikely that there would be any occurrence of a pollution event either accidental or otherwise that could directly or indirectly cause a significant effect to a Natura 2000 site.

As such, pollution events are not considered further as a potential impact in this report, screened out.

4.4 IN-COMBINATION SCREENING FOR CUMULATIVE EFFECTS

In-combination screening for cumulative effects has been undertaken following the approach outlined in the European Commission Notice Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive (EC, 2021).

4.4.1 DEFINING CUMULATIVE EFFECTS SPATIAL SCOPE (CESS)

The boundary for examination of cumulative effects has been defined considering the types of impact which relate to the activities set out in the AIMU document which accompanies this MUL application and includes remote (off-site) locations as set out in (EC, 2021).

Impacts of noise associated with the planned survey activities are considered to have the widest spatial reach, with Harbour porpoise the designated Natura 2000 site feature which is most sensitive to noise disturbance (JNCC, 2020).

Proposed noise producing activities are provided below in Table 4-11.

Table 4-11 Noise sources during site investigation activities

Survey technique	Operating frequency (kHz)	Sound pressure level (SPL_{PEAK}) (dB re 1µPa @1m)	Sound Exposure Level (SEL_{PEAK} (unweighted); dB re 1µPa^{-2}s)	Source/ Reference
Impulsive				
Airgun Array (2000 psi, 4500 in^3)	0.005 - 0.3	230–260		Multiple GI-Source or other airguns (Duffy *et al*., 2023; Hildebrand, 2009)
Multi-beam Echosounder (MBES) (<200m)	170 - 700	198 - 228		Sonic 2024-V or the Kongsberg EM2040 MKII (Kongsberg, 2024a; R2Sonic, 2024)
Side Scan Sonar (SSS)	500-900 (high)	196 - 224		L3 Klein 5000, Egetech 4200 (Duffy *et al*., 2023; Ruppel *et al.*, 2022)
Sub Bottom Profiler (Parametric Pinger)	1 - 115	206 - 247		TOPAS, Innomar systems (Ruppel *et al.*, 2022)
Sub Bottom Profiler (Sparker)	0.3 – 1.4	185 - 226		Applied Acoustics Delta Sparker, SIG ELC sparker (Duffy *et al*., 2023; Ruppel *et al*., 2022)
Sub Bottom Profiler (Boomer)	0.3 - 3	185 - 207		Applied Acoustics S-boom (Duffy *et al*., 2023; Ruppel *et al*., 2022)
USBL (Ultra Short Baseline)	18-32 kHz	192 - 207		Kongsberg HiPAP, Applied Acoustics EasyTrak Nexus Model EZT-2691 (Applied Acoustics, 2024; Kongsberg, 2024b)

Survey technique	Operating frequency (kHz)	Sound pressure level (SPL_{PEAK}) (dB re 1µPa @1m)	Sound Exposure Level (SEL_{PEAK} (unweighted); dB re $1\mu Pa^{-2}s$)	Source/ Reference
Vessel noise	0.05 – 0.3	N/A	150 – 175	Southall *et al*., 2007

The JNCC Guidance on Assessing the Significance of Noise Disturbance Against Harbour Porpoise SACs Conservation Objectives (JNCC, 2020) has therefore been used to determine the boundary for examination of cumulative effects (Table 4-12). The guidance uses published ranges for effects of noise from different noise producing activities to determine Effective Deterrence Ranges (EDRs). Where evidence is limited for a particular activity, the EDR is informed by studies which consider the most similar sound levels or other appropriate characteristics.

Table 4-12 Noise sources and Effective Deterrence Ranges (EDRs)

Survey technique	Operating frequency (kHz)	Sound pressure level (SPL_{PEAK}) (dB re 1µPa @1m)	Sound Exposure Level (SEL_{PEAK} (unweighted); dB re $1\mu Pa^{-2}s$)	EDR (JNCC, 2020)
Impulsive				
Airgun Array (2000 psi, 8000 in^3)	0.005 - 0.2	230–260		12 km EDR range for using seismic airguns.
Multi-beam Echosounder (MBES) (<200m)	200 - 700	198 - 228		5 km using EDR range for geophysical activity.
Side Scan Sonar (SSS)	500-900 (high)	196 - 224		5 km using EDR range for geophysical activity.
Sub Bottom Profiler (Parametric Pinger)	85 - 115	220 - 247		5 km using EDR range for geophysical activity.
Sub Bottom Profiler (Sparker)	0.3 – 1.4	185 - 226		5 km using EDR range for geophysical activity.
Sub Bottom Profiler (Boomer)	0.3 - 3	185 - 207		5 km using EDR range for geophysical activity.
USBL (Ultra Short Baseline)	18-32 kHz	192 - 207		5 km using EDR range for geophysical activity.
Vessel noise	0.05 – 0.3	N/A	150 – 175	N/A

In line with Table 4-12 above, the EDR has been conservatively chosen as 24 km (a doubling of the 12 km range for seismic airgun activities), with projects within this range judged to be within the CESS and taken forward for temporal assessment.

4.4.2 DEFINING CUMULATIVE EFFECTS TEMPORAL SCOPE (CETS)

The temporal scope for examination of cumulative effects has been defined considering the period over which the licence activities would take place.

A licence period of **7 years** is being sought for this project to ensure the licence can enable site investigation works. The Cumulative Effects Temporal Scope (CETS) is **therefore 7 years**.

4.4.3 IMPACT IDENTIFICATION

Impact types that can affect the structure and functions of the Natura 2000 sites considered have been considered as set out in (EC, 2021).

The impacts identified are:

- Disturbance from vibration and underwater noise from survey activities
- Injury due to collision (survey vessels/sampling equipment)
- Physical and airborne noise disturbance to birds
- Pollution event

4.4.4 PATHWAY IDENTIFICATION

Potential cumulative pathways (e.g. via water, air; accumulation of effects in time or space) have been considered as set out in (EC, 2021) and are provided in Table 4-13.

Table 4-13 Impact and potential cumulative pathway identification

Impact	Potential Cumulative Pathway
Disturbance from vibration and underwater noise from survey activities	Pathway possible via sound travelling through water as set out in Section 3.4.1 and 4.3.2 with impacts possible within CESS where there is temporal overlap with other projects conducting noise producing site investigation activities.
Injury due to collision (survey vessels/sampling equipment)	Pathway requires direct spatial overlap. Potential pathway for injury due to collision between marine mammals and vessels with additional projects vessels where there is direct spatial and temporal overlap.
Physical and airborne noise disturbance to birds	Pathway possible via sound travelling through air, not considered likely to extend beyond MUL application area boundary. Potential pathway for disturbance from the physical presence and noise associated with survey vessels and activities from projects where there is temporal and spatial overlap in the MUL application area boundary.

Impact	Potential Cumulative Pathway
Pollution event	Pathway possible via water and accumulation of effects in time or space. Impacts possible within CESS where there is spatial or temporal overlap with other projects conducting site investigation activities.

4.4.5 PREDICTION

The magnitude and extent of identified likely cumulative effects have been predicted below following EC, 2021 guidance.

4.4.5.1 DISTURBANCE FROM VIBRATION AND UNDERWATER NOISE

The underwater noise pathway for cumulative impacts for 'Disturbance from vibration and underwater noise' where temporal overlap occurs has been considered for the potential impacts with this and other projects. There is the potential for underwater noise disturbance effects if geophysical activities with other projects were to take place at the same time. Therefore, significant likely cumulative effects will be considered further.

4.4.5.2 INJURY DUE TO COLLISION

The collision pathway for cumulative impacts 'injury due to collision' has been considered where temporal and spatial overlap occurs between this project and other projects. The magnitude and extent of the cumulative impact of increased collision risk is unlikely to be significant as vessels involved in surveys are either stationary or travelling slowly (at approx. 5 knots), allowing marine mammals time to avoid collision with these vessels. The magnitude and extent of the impact is therefore unlikely to be significant.

4.4.5.3 PHYSICAL AND AIRBORNE DISTURBANCE TO BIRDS

The airborne noise pathway for cumulative impacts to bird species for 'Physical and airborne disturbance' where temporal overlap occurs has been considered for the potential impacts with these and other projects.

4.4.5.4 POLLUTION EVENT

The pathway for 'pollution event' has been considered for cumulative impacts between this and other projects in the vicinity. The magnitude and extent of the cumulative impact of increased risk of pollution event is unlikely to be significant as all vessels conducting survey activities will be MARPOL compliant and fully certified by the Maritime Safety Office.

4.4.6 IDENTIFICATION OF PLANS AND PROJECTS THAT COULD ACT CUMULATIVELY

Following the approach outline in (EC, 2021), which suggests that information regarding "characteristics of other plans or projects (implemented, approved or proposed) that may cause in-combination or cumulative effects with the project being assessed on Natura 2000 sites" should be sourced from databases (e.g. on SEA, EIA, appropriate assessments of plans/projects, regional or

municipal plans, local authority planning applications) available from Competent Authorities, plans and projects within the CESS and CETS have been examined as part of this SISAA Screening Report.

Plans from other developer proposed offshore wind projects within the CESS and CETS were examined as part of this SISAA Screening Report (Figure 4-11).

Other consented activities/developments and applications for activities or development within the CESS and CETS have also been considered for the potential to cause cumulative effects with the site investigation activities proposed under this Licence Application on Special Areas of Conservation, Special Protection Areas and their qualifying interests.

Searches were conducted of the following:

- Applications and lease/licence database of the Department of Housing, Local Government and Heritage
- Local Authority (County Council) Planning lists
- An Bord Pleanála Planning Lists
- Department of Agriculture Food and the Marine Aquaculture Licence lists
- The Maritime Area Regulatory Authority's Maritime Usage Licence Applications database

Details of these projects, their interaction with the activities proposed under this Maritime Usage Licence Application and the potential for likely cumulative effects is set out in Table 4-16.

Table 4-14 Activities and Developments identified for consideration as part of the screening exercise

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
Tulca	FS007431	Cork	Offshore Windfarm Site Investigations	Applied	The Foreshore Licence application is to undertake the surveys and site investigations to inform development and project design for the proposed site of Tulca Offshore Array Limited's proposed Tulca Offshore Array offshore wind	27.05

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
					project. Proposed surveys include Geophysical, Geotechnical, and Metocean.	
Floating Cork	FS007471	Cork	Offshore Windfarm Site Investigations	Info online	Floating Cork Offshore Wind Limited is seeking to undertake benthic ecology surveys within an offshore export cable corridor area. The surveys are conducted on the shoreline and in the marine area and are routine in establishing the baseline benthic ecology conditions for areas for a number of purposes including conservation, environmental status and in this particular case to support the Environmental Impact Assessment Report for the proposed Floating Cork Offshore Wind Farm.	29.49

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
Floating Cork FLA	FS007471	Cork	Offshore Windfarm Site Investigations	Applied	Seeking to undertake benthic ecology surveys within an offshore export cable corridor area. The surveys are conducted on the shoreline and in the marine area and are routine in establishing the baseline benthic ecology conditions	42.75
Kinsale Offshore Windfarm	FS007354	Cork	Offshore Windfarm Site Investigations	Consultation	The surveys will gather further information on: seabed and sub-seabed conditions; geotechnical data on the stability of soils, sediments, clays and gravels to allow the characterisation of the sub-seabed strata to inform design; wind and metocean (wave, current, tide and water levels) information; provide the project team with baseline information on the environmental conditions at the site, including marine ecology, bird, mammals and benthos; provide the project team with information on	45.51

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
					the archaeological conditions at the site.	
EirGrid Celtic Interconnector Electricity Cable	FS006916	Cork	Licence for proposed interconnector project subsea cable	Determined	EirGrid PLC are applying for a licence for the Celtic Interconnector project. The Celtic Interconnector is a proposed electrical link, consisting primarily of a subsea cable, which will enable the movement of electricity between Ireland and France and will be the first direct energy link between the two countries, running from the south coast of Ireland to the north-west coast of France. This proposed international development will constitute high technology infrastructure that is	46.01

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
					approximately 575 km in length across both terrestrial and marine environments. Construction estimated to be completed in 2026.	
Tulca Cable Corridor	FS007431	Cork	Offshore Windfarm Site Investigations	Applied	The Foreshore Licence application is to undertake the surveys and site investigations to inform development and project design for the proposed site of Tulca Offshore Array Limited's proposed Tulca Offshore Array offshore wind project. Proposed surveys include Geophysical, Geotechnical, and Metocean. A phased approach to development will be taken.	46.56
Emerald FLA	FS007139	Cork	Offshore Windfarm Site Investigations	Consultation	Site investigations to inform the design of a possible deep-water offshore wind power generation project off Kinsale.	47.45

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
Inis Ealga	FS007404	Cork	Offshore Windfarm Site Investigations	Consultation	This foreshore application relates to the Site Investigation works only. These activities are required to inform: the overall project feasibility; the conditions at site and along the cable route; the various assessments required to progress the project; and the development of the project	63.67
DECC south coast Dmap	LIC240006	Wexford, Waterford and Cork	Geophysical Site Investigation works	Determined	Geophysical survey works in the South Coast DMAP area to inform future offshore renewable energy development	66.07
RNLI Site Investigation Works Courtmacsherry	FS007552	Cork	Site investigation works for jetty design and disposal options for dredged material	Applied	Site investigation works to inform the design of a new RNLI jetty and berth and to inform disposal options for dredged sediment material.	70.39

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
Voyage Offshore Array	FS0073436	Waterford	Offshore Windfarm Site Investigations	Info online	The overall Voyage Offshore Array Project relates to an offshore floating wind farm located which will be located off the west coast of Ireland, predominantly off the coast of Waterford and south county Wexford. Proposed surveys include Geophysical, Geotechnical, and Environmental	73.922
Inis Ealga FLA	FS007404	Cork	Offshore Windfarm Site Investigations	Consultation	This foreshore application relates to the Site Investigation works only. These activities are required to inform: the overall project feasibility; the conditions at site and along the cable route; the various assessments required to progress the project; and the development of the project.	77.83
Helvic Head ESB FLA	FS007136	Waterford	Offshore Windfarm Site Investigations	Consultation	Foreshore Licence for Site Investigations to inform the engineering and design of a potential offshore wind farm and	79.69

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
					associated export cable route at a site	
Celtic One Offshore	FS007138	Waterford	Offshore Windfarm Site Investigations	Consultation		80.62
Usice Éireann ADCP Surveys at Cork Harbour	FS007376	Cork	ADCP surveys	Applied	Uisce Éireann wish to conduct a strategic modelling study of water currents within Cork Harbour and its environs. The study requires the deployment of up to nine (9) Acoustic Doppler Current Profilers (ADCPs) at various locations within the area to provide the data required to conduct the modelling.	81.03
Port of Cork Maintenance Dredging	FS007126	Cork	Maintenance Dredging	Determination	Maintenance dredging to facilitate the maintenance of the port berth, basins and approach channels into Port of Cork	83.55
Port of Cork Site	FS007098	Cork	Marine Site Investigations	Applied	geophysical, geotechnical, environmental surveys, interitdal	87.64

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
Investigations at Dognose Bank					benthic surveys and marine mammal surveys at Dognose Bank, Corkbeg, Whitegate	
Port of Cork Company Harbour Development Works	FS006408	Cork	Harbour Development Works	Determination	Foreshore Lease and Licence application for Harbour Development Works	89.44
Dredging at Hawlbowline Naval Base	FS007482	Cork	Maintenance Dredging	Applied	maintenance dredging of the Naval Basin Approach channel and capital dredging of the Graving Dock to -5.5m CD to ensure the naval fleet can safely navigate.	89.81
Haulbowline Naval Case Dept of Defence	MUL230029	Cork	Maintenance Dredging	Applied	maintenance dredging of the Naval Basin Approach channel and capital dredging of the Graving Dock to -5.5m CD to ensure the naval fleet can safely navigate.	89.81
Doyle shipping group	LIC230019	Cork	Site investigations for increased port	Applied	Site investigations in the maritime area including reclaimed dockland and surrounding nearshore to aid	91.56

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
			facility designs for ORE		the design of increased port facilities in support of the ORE industry	
Helvick Head Energia	FS006982	Waterford	Offshore Windfarm Site Investigations	Determination	Geophysical, Geotechnical, Archaeological, Ecological, Oceanographic and Meteorological investigations to determine optimum design for windfarm, cabling and associated structures	112.24
East Celtic	FS007318	Waterford	Offshore Windfarm Site Investigations	Applied	Wishes to investigate the feasibility of developing an offshore wind farm and is applying for a licence to undertake site investigation activities on a site. The Foreshore Licence Application Area at its closest point lies 11.23 km from the Saltee Islands and 9.08 km from mainland Wexford. RWE Renewables Ireland East Celtic Limited is seeking to undertake a variety of marine surveys at the Foreshore Licence Application Area	112.79

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
					in order to inform the specific location, design and layout of the proposed offshore wind farm.	
Celtic Sea Array Area	FS006983	Waterford	Offshore Windfarm Site Investigations	Consultation	Geophysical, Geotechnical and Environmental Site Investigation works	115.103
Helvick Head ESB Array Area	FS00136	Waterford	Offshore Windfarm Site Investigations	Consultation	Foreshore Licence for Site Investigations to inform the engineering and design of a potential offshore wind farm	119.33

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
North Celtic Sea	n/a	Waterford	Offshore Windfarm Site Investigations	Info online/withdrawn	Offshore Windfarm Site Investigation Activities	119.623
Voyage FLA	FS0073436	Waterford	Offshore Windfarm Site Investigations	Applied	Offshore Windfarm Site Investigation Activities	122.66
Port of Cork Bantry Harbour Development Works	FS006437	Cork	harbour development works	Consultation	Foreshore lease application for harbour development works	146.45

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
ORCA Ireland	FS007359	Cork	Hydrophone buoy deployment offshore south east of Toe Head	Determination	Foreshore licence application for the deployment of 1 Static Acoustic Monitoring (SAM) SmartBuoy off the south coast of Ireland to listen to cetaceans in real-time	155.19
Port of Waterford - Waterford Estuary	LIC230025	Waterford	Maintenance Dredging	Applied	Maintenance dredging of accumulated sediments to maintain the port's navigational trade areas.	160.54
Valentia Island	FS007365	Kerry	Offshore Windfarm Site Investigations	Applied	The overall Valentia Island Energy Ltd Project relates to an offshore floating wind farm at a proposed location off the coast of Valentia Island, county Kerry off the southwest coast of Ireland. This Foreshore Licence application is to undertake the surveys and site	166.84

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
					investigations to inform development and project design for the project. Proposed surveys include Geophysical, Geotechnical, Environmental and Metocean.	
APEM Group Blasket Sound	MUL240001	Kerry	Environmental Monitoring	Applied	Deployment of PAM devices	190.43
EirGrid Site Investigations to inform Offshore Renewable Grid Infrastructure	FS007660	Cork	Marine Site Investigations	Withdrawn	Geophysical and geotechnical site investigation works, environmental surveys to inform the location and development of offshore electricity transmission infrastructure to facilitate renewable energy	n/a

Project Name/Title	FS No./LIC/Reference Number	County	Project Type	Status	Proposed Activity	Distance from MUL (km)
Cork County Council Development Plan 2022-2028	n/a	Cork (South)	Cork County Development plan up to 2028	n/a	Port of Cork to expand facilities in Ringaskiddy. Relocating Tivoli container terrminal to the lower harbour at Ringaskiddy.	n/a
University College Cork Cetacean Study within the Irish and Celtic Seas	LIC23006	Cork	Deployment of PAM devices	Determined	PAM work commenced 18th December 2023. For up to 3 years. Equipment will be serviced every 4 months. Placed 10 km from shore.	

From this assessment, no projects are proposed within the CESS. All other projects listed above lie outside of the defined Cumulative Effects Spatial Scope (CESS), Figure 4-11 and Figure 4-12 below provide an indication as to the locations of some of these projects in relation to the proposed MUL area.

It should be noted, that with the recent Government policy change to a plan-led approach for the development of offshore wind projects post Phase One, it is currently uncertain which of the offshore wind site investigation licences noted below will be progressed, if any.

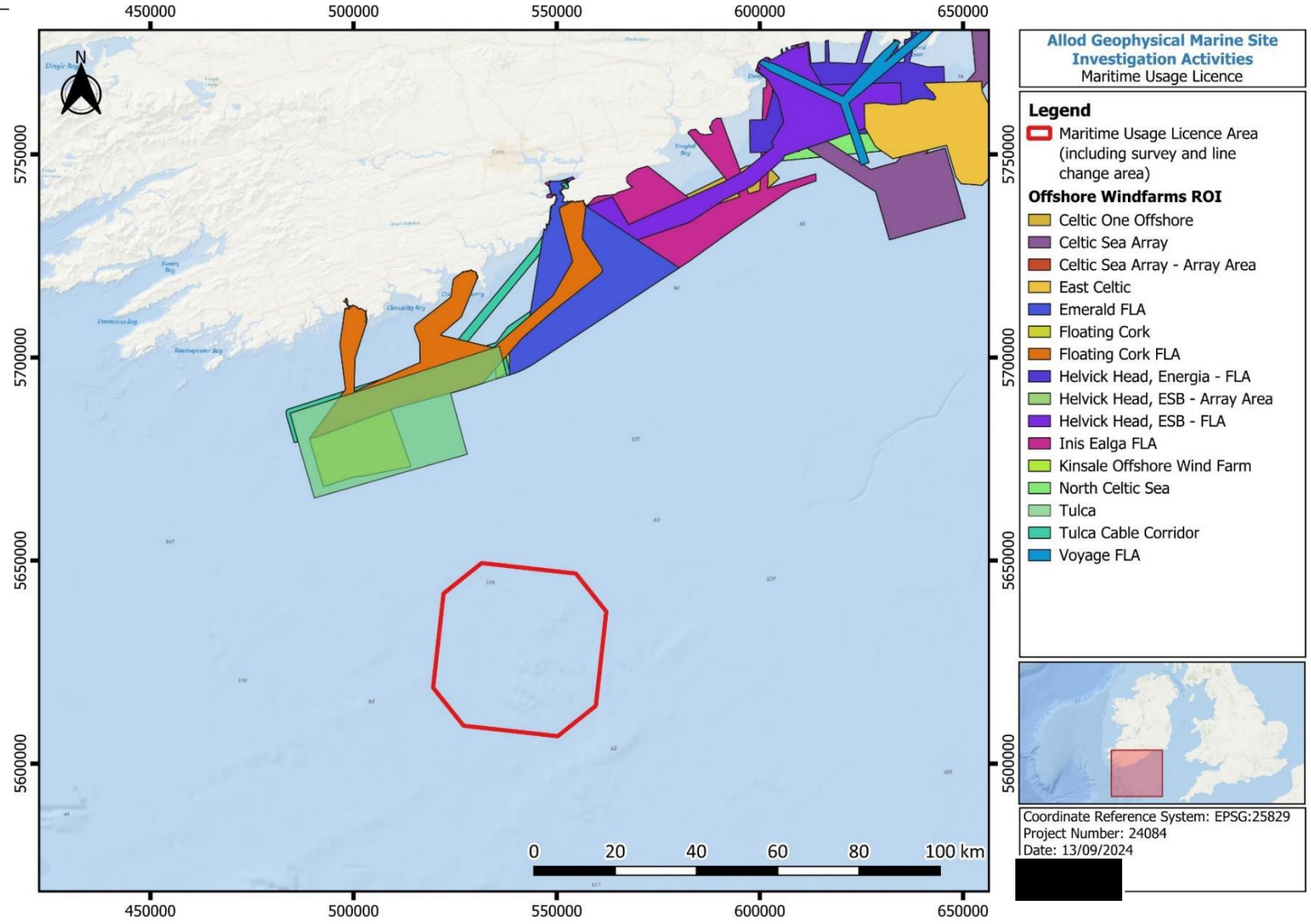

Figure 4-11 Locations of nearby proposed OWF project Site Investigation Licence Application Areas in relation to the Seismic MUL Application Area

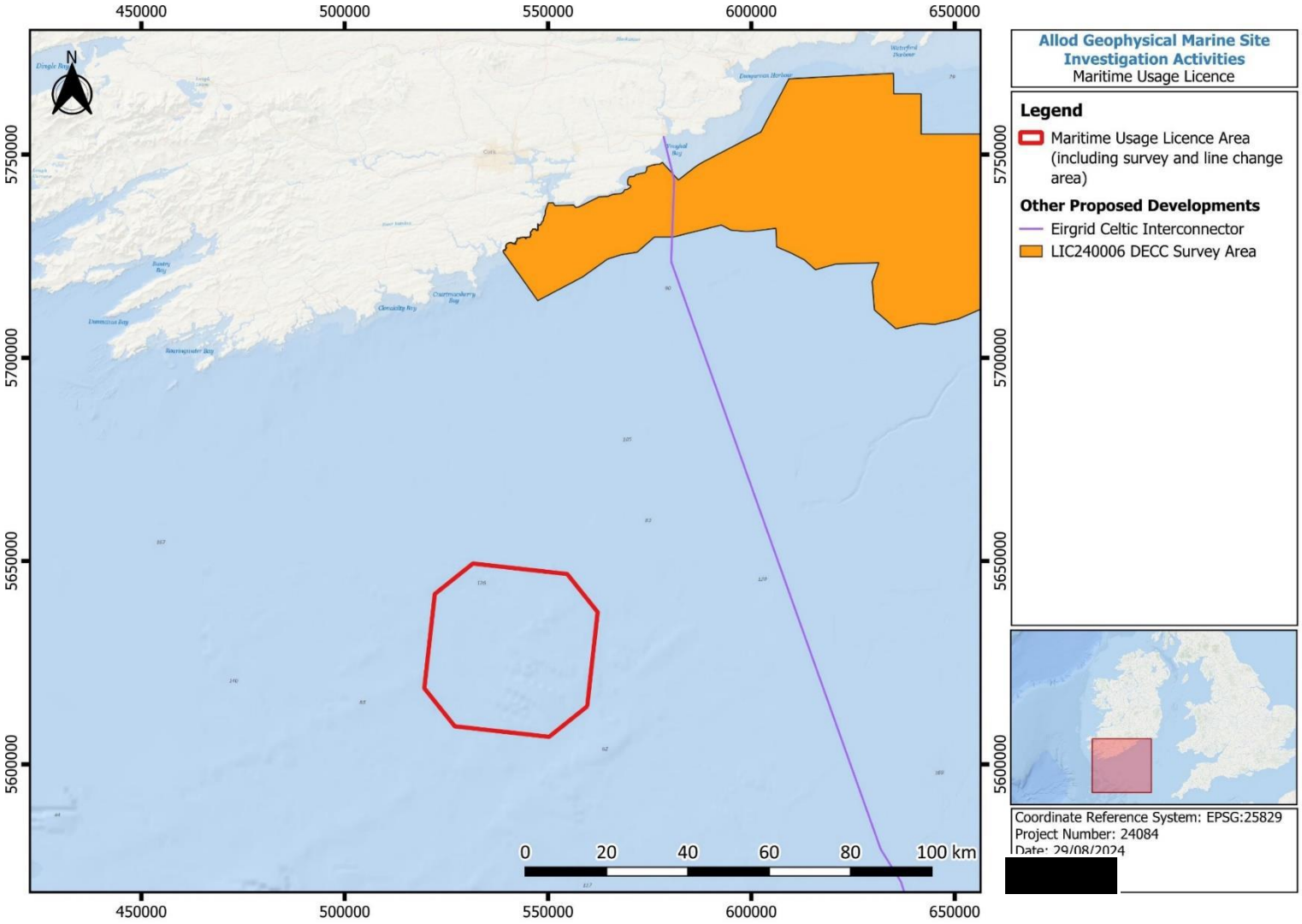

Figure 4-12 Location of other nearby identified offshore planning applications

4.4.7 CUMULATIVE EFFECT ASSESSMENT CONCLUSION

Potential cumulative effects between the proposed Allód Site Investigation Activities and other projects have been assessed.

As no other developments are proposed within the CESS it is concluded that no cumulative effects are likely to result from the proposed SI activities.

4.4.8 TRANSBOUNDARY EFFECTS ASSESSMENT

Potential transboundary effects were consideredas the MUL application area is 23 km from the UK Exclusive Economic Zone and within the CESS of the proposed site investigation activities. No UK projects were identified within 24 km of the Proposed Licence Area.

5 SCREENING DETERMINATION STATEMENT

The following SACs and QIs and SPA and SCIs have been screened in for stage 2 Appropriate Assessment as they have designated mobile species that may enter the Maritime Usage Licence Area:

Table 5-1 Appropriate Assessment Screening Summary by Species for Mobile Marine Mammals

Summary of Relevant Sites	Species	Relevant Information
Roaringwater Bay and Islands SAC 000101 Kenmare River SAC 002158 Hook Head SAC 000764 Blasket Islands SAC 002172 Carnsore Point SAC 002269 Blackwater Bank SAC 002953 Belgica Mound Province SAC 002327 Rockabill to Dalkey Island SAC 003000 Inishmore Island SAC 000213 Codling Fault Zone SAC 003015 Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625 Gweedore Bay and Islands SAC 001141 West Connacht Coast SAC 002998 Roaringwater Bay and Islands SAC Bristol Channel Approaches / Dynesfeydd Môr Hafren UK0030396 West Wales Marine / Gorllewin Cymru Forol UK0030397 North Anglesey Marine / Gogledd Môn Forol UK0030398 North Channel UK0030399	Harbour Porpoise *(Phocoena phocoena)*	The harbour porpoise is the smallest and most abundant cetacean in Irish waters and possibly the most abundant in the northeast Atlantic. It is common around the entire Irish coast. Sightings are common from June through the autumn/winter period but reduced sightings in spring suggest they move offshore, possibly to calving/breeding grounds. Harbour porpoise is one of two cetacean species with designated SACs considered within this Appropriate Assessment Screening. They utilise in-water acoustics for communication and echolocation and are sensitive to the noise generated by the site investigation activities (Richardson et al., 1995). Porpoises are “high-frequency” cetaceans sensitive to noise in the 200Hz – 180kHz range (Southall et al., 2007). The greatest potential impact on this species from the proposed site investigation activities would be from noise generated by SBP, HESS and seismic airgun arrays. This activity has the potential to be within the hearing threshold of harbour porpoise. This species is a mobile species which may be found within the Maritime Usage Licence Area and therefore, there is the possibility of likely significant effects on the conservation objectives for this species in the absence of mitigation

Summary of Relevant Sites	Species	Relevant Information
Mers Celtiques - Talus du golfe de Gascogne FR5302015 Récifs du talus du golfe de Gascogne FR5302016 Nord Bretagne DH FR2502022 Ouessant-Molène FR5300018 Abers - Côte des legends FR5300017 Chaussée de Sein FR5302007 Baie de Morlaix FR5300015 Côte de Granit rose-Sept-Iles FR5300009 Côtes de Crozon FR5302006 Tregor Goëlo FR5300010 Récifs et landes de la Hague FR2500084 Anse de Vauville FR2502019 Cap d'Erquy-Cap Fréhel FR5300011 Baie de Saint-Brieuc – Est FR5300066 Banc et récifs de Surtainville FR2502018 Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard FR5300012 Chausey FR2500079 Estuaire de la Rance FR5300061 Baie du Mont Saint-Michel FR2500077		measures, therefore this species and the relevant SACs are **screened in for Stage 2 Appropriate Assessment.**
Mers Celtiques - Talus du golfe de Gascogne FR5302015 Récifs du talus du golfe de Gascogne FR5302016 Nord Bretagne DH FR2502022 Ouessant-Molène FR5300018	Bottlenose Dolphin (*Tursiops truncatus*)	The Bottlenose dolphin is one of two cetacean species with a designated SAC considered within this Appropriate Assessment Screening. They utilise in-water acoustics for communication and echolocation and are sensitive to the noise generated by the site investigation activities (Richardson et al., 1995). Bottlenose dolphin hear in the mid frequency range (150 – 160,000 Hz) (DAHG, 2014). The greatest impact on this species from the proposed site investigation activities would be the noise generated by sub-bottom profiler (SBP) and airgun

Summary of Relevant Sites	Species	Relevant Information
Abers - Côte des legends FR5300017 Chaussée de Sein FR5302007 Côte de Granit rose-Sept-Iles FR5300009 Tregor Goëlo FR5300010 Récifs et landes de la Hague FR2500084 Anse de Vauville FR2502019 Cap d'Erquy-Cap Fréhel FR5300011 Baie de Saint-Brieuc – Est FR5300066 Banc et récifs de Surtainville FR2502018 Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard FR5300012 Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire FR2500085 Chausey FR2500079 Baie du Mont Saint-Michel FR2500077 Baie de Seine occidentale FR2502020 Baie de Seine orientale FR2502021 Littoral Cauchois FR2300139 Estuaires et littoral picards (baies de Somme et d'Authie) FR2200346 Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant FR3100478		arrays. This has the potential to be within the hearing threshold of bottlenose dolphin. This species is mobile and may be found within the Maritime Usage Licence Area and therefore there is the possibility of likely significant effects on the conservation objectives for this species in the absence of mitigation measures. Therefore, this species and the relevant SACs are **screened in for Stage 2 Appropriate Assessment**.
Roaringwater Bay and Islands SAC 000101 Kenmare River SAC 002158 Saltee Islands SAC 000707 Slyne Head Islands SAC 000328 Lambay Island SAC 000204	Grey Seal *(Halichoerus grypus)*	The Grey seal is the larger and more abundant of the two seal species resident in Ireland. They spend much of the year at sea and may range widely in search of prey. They come ashore in autumn to form breeding colonies on rocky shores, beaches and caves – often on small uninhabited islands. They are found

Summary of Relevant Sites	Species	Relevant Information
Inishbofin and Inishark SAC 000278 Duvillaun Islands SAC 000495 Inishkea Islands SAC 000507 Isles of Scilly Complex UK0013694 Pembrokeshire Marine/ Sir Benfro Forol UK0013116 Lundy UK0013114		all around the coast wherever habitats are suitable and are most abundant along the exposed south, southwest and west coasts. The two major Irish breeding sites for grey seals are the Inishkea Islands (Mayo) and the Blasket Islands (Kerry). Smaller groups breed at Lambay Island (Dublin), Slyne Head (Galway) and the Saltee Islands (Wexford). The Grey seal is listed as a protected Annex II species for SACs assessed in this Appropriate Assessment Screening. The Grey Seal can hear sound in water at low frequencies relative to cetaceans (75Hz – 75kHz) (Southall et al., 2007) and would be sensitive to the noise from the survey equipment and vessels. As it is a mobile species with the potential to be present within the Maritime Usage Licence Area, there is the possibility of likely significant effects on the conservation objectives for this species in the absence of mitigation measures. This species and the relevant SACs are **screened in for Stage 2 Appropriate Assessment.**
Glengarriff Harbour and Woodland SAC 000090 Slaney River Valley SAC 000781	Common (Harbour) Seal *(Phoca vitulina)*	The common, or harbour seal, is the smaller of the two seal species resident in Ireland. Despite its name, it is less common than the grey seal. The common seal is the characteristic seal of sandflats and estuaries but are also found on rocky shores. Seals may range widely in search of prey, but individuals often return to favoured haul-out sites to rest or to give birth. The Common seal is listed as a protected Annex II species for SACs assessed in this Appropriate Assessment Screening. The Common Seal can hear sound in water at low frequencies relative to cetaceans (75Hz – 75kHz) (Southall et al., 2007) and would be sensitive to the noise from the survey equipment and vessels. As it is a mobile species with the potential to be present within the Maritime Usage Licence Area, there is the possibility of likely significant effects on the conservation objectives for this species in the absence of mitigation measures.

Summary of Relevant Sites	Species	Relevant Information
		This species and the relevant SACs are **screened in for Stage 2 Appropriate Assessment.**

Table 5-2 SAC with their relevant Mobile Annex II species and distance to the Licence Area

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs	Impact
000101	Roaringwater Bay and Islands SAC	83.90	Grey Seal *(Halichoerus grypus)* [1364] Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
002158	Kenmare River SAC	131.42	Harbour Porpoise *(Phocoena phocoena)* [1351] Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys
000090	Glengarriff Harbour and Woodland SAC	144.21	Harbour Seal (*Phoca vitulina*) [1365]	Disturbance due to underwater noise associated with surveys
000764	Hook Head SAC	154.52	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
000707	Saltee Islands SAC	170.04	Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs	Impact
002172	Blasket Islands SAC	187.25	Harbour Porpoise *(Phocoena phocoena)* [1351] Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys
002269	Carnsore Point SAC	189.61	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
002953	Blackwater Bank SAC	206.85	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
000781	Slaney River Valley SAC	214.53	Harbour Seal (*Phoca vitulina*) [1365]	Disturbance due to underwater noise associated with surveys
002327	Belgica Mound Province SAC	232.07	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
003000	Rockabill to Dalkey Island SAC	318.22	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
000213	Inishmore Island SAC	318.77	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
003015	Codling Fault Zone SAC	340.33	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
000328	Slyne Head Islands SAC	340.82	Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys
000204	Lambay Island SAC	344.63	Grey Seal *(Halichoerus grypus)* [1364] Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs	Impact
000278	Inishbofin and Inishark SAC	362.70	Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys
000495	Duvillaun Islands SAC	416.91	Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys
000507	Inishkea Islands SAC	418.73	Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys
002998	West Connacht Coast SAC	425.44	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
000625	Bunduff Lough and Machair/Trawalua/Mullaghmore SAC	546.07	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
001141	Gweedore Bay and Islands SAC	577.04	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
UK SACs				
UK0013694	Isles of Scilly Complex	145.721	Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs	Impact
UK0030396	Bristol Channel Approaches / Dynesfeydd Môr Hafren	192.343	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
UK0013116	Pembrokeshire Marine/ Sir Benfro Forol	194.285	Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys
UK0013114	Lundy	245.941	Grey Seal *(Halichoerus grypus)* [1364]	Disturbance due to underwater noise associated with surveys
UK0030397	West Wales Marine / Gorllewin Cymru Forol	262.742	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
UK0030398	North Anglesey Marine / Gogledd Môn Forol	344.811	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
UK0030399	North Channel	426.362	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
France SACs				

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs	Impact
FR5302015	Mers Celtiques - Talus du golfe de Gascogne	223.11	Harbour Porpoise *(Phocoena phocoena)* [1351] Bottlenose Dolphin (*Tursiops truncatus*) [1349]	Disturbance due to underwater noise associated with surveys
FR5302016	Récifs du talus du golfe de Gascogne	264.09	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
FR2502022	Nord Bretagne DH	324.15	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
FR5300018	Ouessant-Molène	328.17	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
FR5300017	Abers - Côte des légendes	340.56	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
FR5302007	Chaussée de Sein	362.28	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys
FR5300015	Baie de Morlaix	367.57	Harbour Porpoise *(Phocoena phocoena)* [1351]	Disturbance due to underwater noise associated with surveys

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs	Impact
FR5300009	Côte de Granit rose-Sept-Iles	369.35	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR5302006	Côtes de Crozon	372.96	Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR5300010	Tregor Goëlo	393.87	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR2500084	Récifs et landes de la Hague	459.83	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR2502019	Anse de Vauville	461.12	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR5300011	Cap d'Erquy-Cap Fréhel	462.31	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR5300066	Baie de Saint-Brieuc - Est	462.51	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs	Impact
FR2502018	Banc et récifs de Surtainville	465.18	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR5300012	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard	485.41	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR2500079	Chausey	487.00	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR2500085	Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire	495.63	Bottlenose Dolphin (*Tursiops truncatus*) [1349]	Disturbance due to underwater noise associated with surveys
FR5300061	Estuaire de la Rance	502.64	Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR2500077	Baie du Mont Saint-Michel	515.78	Bottlenose Dolphin (*Tursiops truncatus*) [1349] Harbour Porpoise *(Phocoena phocoena*) [1351]	Disturbance due to underwater noise associated with surveys
FR2502020	Baie de Seine occidentale	524.30	Bottlenose Dolphin (*Tursiops truncatus*) [1349]	Disturbance due to underwater noise associated with surveys
FR2502021	Baie de Seine orientale	586.03	Bottlenose Dolphin (*Tursiops truncatus*) [1349]	Disturbance due to underwater noise associated with surveys

SAC Site code	SAC Site name	By sea distance from MUL Area (km)	QIs	Impact
FR2300139	Littoral Cauchois	697.54	Bottlenose Dolphin (*Tursiops truncatus*) [1349]	Disturbance due to underwater noise associated with surveys
FR2200346	Estuaires et littoral picards (baies de Somme et d'Authie)	700.41	Bottlenose Dolphin (*Tursiops truncatus*) [1349]	Disturbance due to underwater noise associated with surveys
FR3100478	Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant	720.19	Bottlenose Dolphin (*Tursiops truncatus*) [1349]	Disturbance due to underwater noise associated with surveys

6 SCREENING STATEMENT OUTCOME

51 no. SACs, 44 no. SPAs, which included the North-West Irish Sea cSPA and the Seas off Wexford cSPA were considered for the potential for likely significant effects to arise via the identified source-receptor-pathways.

Due to their mobility, the bottlenose dolphin, harbour porpoise, grey seal and common seal have the potential to be present in the Maritime Usage Licence Area during the SI activities. Due to their sensitivity to underwater noise produced by the proposed site investigation activities, there is the possibility of likely significant effects on the SACs identified and their QIs in the absence of mitigation measures.

The Stage 1 Screening for Appropriate Assessment exercise undertaken has identified that likely significant effects on 51 no. Natura 2000 sites from underwater noise as a result of the proposed works requires Stage 2 assessment and the preparation of a Natura Impact Statement (NIS). Likely significant effects on Annex II listed Harbour porpoise (*Phocoena phocoena)*, Bottlenose dolphin (*Tursiops truncatus),* Grey seal (*Halichoerus grypus)* and Common/harbour seal (*Phoca vitulina)* Qualifying Interest species of the following SACs will therefore be considered in a Natura Impact Statement.

Irish SACs:

Roaringwater Bay and Islands SAC

Kenmare River SAC

Glengarriff Harbour and Woodland SAC

Hook Head SAC

Saltee Islands SAC

Blasket Islands SAC

Carnsore Point SAC

Blackwater Bank SAC

Slaney River Valley SAC

Belgica Mound Province SAC

Rockabill to Dalkey Island SAC

Inishmore Island SAC

Codling Fault Zone SAC

Slyne Head Islands SAC

Lambay Island SAC

Inishbofin and Inishark SAC

Duvillaun Islands SAC

Inishkea Islands SAC

Bunduff Lough and Machair/Trawalua/Mullaghmore SAC

Gweedore Bay and Islands SAC

UK SACs

Isles of Scilly Complex SAC

Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC

Pembrokeshire Marine/ Sir Benfro Forol SAC

Lundy SAC

West Wales Marine / Gorllewin Cymru Forol SAC

North Anglesey Marine / Gogledd Môn Forol SAC

North Channel SAC

French SACs

Mers Celtiques - Talus du golfe de Gascogne SAC

Récifs du talus du golfe de Gascogne SAC

Nord Bretagne DH SAC

Ouessant-Molène SAC

Abers - Côte des légendes SAC

Chaussée de Sein SAC

Baie de Morlaix SAC

Côte de Granit rose-Sept-Iles SAC

Côtes de Crozon SAC

Tregor Goëlo SAC

Récifs et landes de la Hague SAC

Anse de Vauville SAC

Cap d'Erquy-Cap Fréhel SAC

Baie de Saint-Brieuc - Est SAC

Banc et récifs de Surtainville SAC

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SAC

Chausey SAC

Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire SAC

Estuaire de la Rance SAC

Baie du Mont Saint-Michel SAC

Baie de Seine occidentale SAC

Baie de Seine orientale SAC

Littoral Cauchois SAC

Estuaires et littoral picards (baies de Somme et d'Authie) SAC

Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC

7 REFERENCES

Applied Acoustics. (2024). *Easytrak Nexus USBL, Model 2691*. AAE Technologies Group. Retrieved August 1, 2024, from https://www.aaetechnologiesgroup.com/applied-acoustics/products/easytrak-usbl-systems/easytrak-nexus-usbl-model-2691/

Barry, J., Kennedy, R., Rosell, R., Roche, W., 2020. Atlantic salmon smolts in the Irish Sea: First evidence of a northerly migration trajectory. Fisheries Management and Ecology. 27. 10.1111/fme.12433

BEIS (2019). Offshore Oil & Gas Licensing 31st Seaward Round. Habitats Regulations Assessment. Appropriate Assessment: Moray Firth. Department for Business, Energy & Industrial Strategy (BEIS), 100pp.

BlueWise Marine, 2023. Impact of Geophysical and Geotechnical Site Investigation Surveys on fish and shellfish. Revision number 2. https://windenergyireland.com/images/files/november-23-impact-of-surveys-on-fisheries-corrected.pdf

Bogdanova MI, Butler A, Wanless S, Moe B, Anker-Nilssen T, Frederiksen M, Boulinier T, Chivers LS, Christensen-Dalsgaard S, Descamps S, Harris MP, Newell M, Olsen B, Phillips RA, Shaw D, Steen H, Strøm H, Thórarinsson TL & Daunt F (2017). Multi-colony tracking reveals spatio-temporal variation in carry-over effects between breeding success and winter movements in a pelagic seabird. Marine Ecology Progress Series 578: 167-181.

Carter MID, Cox SL, Scales KL, Bicknell AWJ, Nicholson MD, Atkins KM, Morgan G, Morgan L, Grecian JW, Patrick SC & Votier SC (2016). GPS tracking reveals rafting behaviour of northern gannets (Morus bassanus): implications for foraging ecology and conservation. Bird Study 63: 83-95.

Carter MID, Boehme L, Cronin MA, Duck CD, Grecian WJ, Hastie GD, Jessopp M, Matthiopoulos J, McConnell BJ, Miller DL, Morris CD, Moss SEW, Thompson D, Thompson PM and Russell DJF (2022). Sympatric Seals, Satellite Tracking and Protected Areas: Habitat-Based Distribution Estimates for Conservation and Management. Front. Mar. Sci. 9:875869. doi: 10.3389/fmars.2022.875869

CEFAS (2024) Salmon Life Cycle https://www.cefas.co.uk/iys/salmon-life-cycle/

Cleasby IR, Owen E, Wilson LJ, Bolton M (2018) Combining habitat modelling and hotspot analysis to reveal the location of high-density seabird areas across the UK: Technical Report. RSPB Research Report no. 63, 135pp.

Cleasby IR, Wakefield ED, Bearhop S, Bodey TW, Votier SC & Hamer KC (2015). Three-dimensional tracking of a wide-ranging marine predator: flight heights and vulnerability to offshore wind farms. Journal of Applied Ecology 52: 1474-1482.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. OJ L 206, 22.7.1992, p. 7–50. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds. OJ L 103, 25.4.1979, p. 1–18. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31979L0409

Crowe, O. (2005). Ireland's Wetlands and their Waterbirds: Status and Distribution. Birdwatch Ireland, Newcastle, Co. Wicklow.

Crowell, S., (2014). In-air and underwater hearing in ducks. Doctoral dissertation, University of Maryland.

Crowell S.E., Wells-Berlin, A.M., Carr, C.E., Olsen, G.H., Therrien, R.E., Yannuzzi, S.E., and Ketten, D.R., (2015). A comparison of auditory brainstem responses across diving bird species. Journal of comparative Physiology A 201: 803-815

Cutts N, Hemingway K and Spencer J (2013). The Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects. Produced by the Institute of Estuarine and Coastal Studies (IECS). Version 3.2.

Goss-Custard, JD. Bowgen, K.M., Stillman, R.A., (2019). Increasing the harvest for mussels *Mytilus edulis* without harming oystercatchers *Haematopus ostralegus*. Marine Ecology Progress Series. Col 612: 101-110.

Davies, P., Britton, R. J., Nunn A. D., *et al*. Novel insights into the marine phase and river fidelity of anadromous twaite shad *Alosa fallax* in the UK and Ireland. *Aquatic Conserv: Mar Freshw Ecosyst*. 2020; 30:1291–1298. https://doi.org/10.1002/aqc.3343

DAHG (2012). Marine Natura Impact Statements in Irish Special Areas of Conservation – A Working Document. April 2012. Prepared by the National Parks and Wildlife Service of the DAHG.

DAHG (2014). Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters. January 2014. Prepared by the National Parks and Wildlife Service, DAHG.

DCCAE (2018). Guidance on Marine Baseline Ecological Assessments & Monitoring Activities for Offshore Renewable Energy Projects Part 1 and 2. Available at https://www.gov.ie/en/publication/3d6efb-guidance-documents-for-offshore-renewable-energydevelopers/

DECC (2021). Seismic Data Acquisition, Reporting and Submission: Mineral Exploration Guidance Document. Geoscience Regulation Office. Version 2021.01. Available at https://assets.gov.ie/137934/65e12d9d-d35c-4db6-a9d9-6c110b5eb899.pdf

DEHLG (2009). Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities. Department of Environment, Heritage and Local Government.

DEHLG (2010). Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities. Department of Environment, Heritage and Local Government, 2010 revision.

Duffy, O., Chumbinho, R., Coca, I., & Breslin, J. (2023). *Impact of geophysical and geotechnical site investigation surveys on fish and shellfish* (Report No. BD00722001). Report by BlueWise Marine. Report for Wind Energy Ireland.

EMODnet (2019) European Marine Observation Data Network Map Viewer. http://www.emodnet.eu/

Erbe, C. & McPherson, C. (2017). Underwater noise from geotechnical drilling and standard penetration testing. The Journal of the Acoustical Society of America 142, EL281-EL285 https://doi.org/10.1121/1.5003328

European Commission Environment Directorate-General (2001). Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodical Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC

European Commission (2002). Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities 2002

European Commission (2007). 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 Commission (2018). Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Communities (2002). Assessment of plans and projects significantly affecting Natura 2000 sites Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

European Commission (2021). Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.C_.2021.437.01.0001.01.ENG&toc=OJ%3AC%3A2021%3A437%3AFULL

Fisheries Ireland https://www.fisheriesireland.ie/species/allis-shad-alosa-alosa

Hawkins, A. D., & Johnstone, A. D. F. (1978). The hearing of the Atlantic salmon, *Salmo salar*. Journal of Fish Biology,13,655–673.

Helm, R.C., Costa, D.P., DeBruyn, T.D., O'Shea, T.J., Wells, R.S. and Williams, T.M. (2014). Overview of Effects of Oil Spills on Marine Mammals. In Handbook of Oil Spill Science and Technology, M. Fingas (Ed.). https://doi.org/10.1002/9781118989982.ch18

Hildebrand, J. (2009). Anthropogenic and natural sources of ambient noise in the ocean. *Marine Ecology Progress Series, 395*, 5-20. https://doi.org/10.3354/meps08353

Jessop, M., Mackey, M., Luck, C., Critchley, E., Bennison, A., and Rogan, E. (2018). The seasonal distribution and abundance of seabirds in the western Irish Sea. Department of Communications, Action and Environment, and National Parks and Wildlife Service, Department of Culture, Heritage & the Gaeltacht, Ireland. 90pp.

JNCC (2017). JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys which can be downloaded from http://jncc.defra.gov.uk/marine/seismic_survey

JNCC (2019) The UK Approach to assessing Conservation Status for the 2019 Article 17 reporting under the EU Habitats Directive. Joint Nature Conservation Committee, Peterborough. Available to download from https://jncc.gov.uk/article17.

JNCC (2020). Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales & Northern Ireland). JNCC Report No. 654, JNCC, Peterborough, ISSN 0963-8091. https://data.jncc.gov.uk/data/2e60a9a0-4366-4971-9327-2bc409e09784/JNCC-Report-654-FINAL-WEB.pdf

JNCC (2021a). Bristol Channel SAC. https://sac.jncc.gov.uk/site/UK0030396 [Accessed on 03/12/2021].

JNCC (2021b). North Channel SAC. https://jncc.gov.uk/our-work/north-channel-mpa/ [Accessed on 30/07/2021].

JNCC (2021c). West Wales Marine SAC. https://jncc.gov.uk/our-work/west-wales-marine-mpa/ [Accessed on 03/12/2021].

JNCC (2021d) Lundy SAC. https://sac.jncc.gov.uk/site/UK0013114 [Accessed on 13/12/2021].

Kemp, P., Sear, D., Collins, A, Naden, P., and Jones, J. (2011). The Impacts of Fine Sediment on Riverine Fish. Hydrological Processes. 25. 1800 - 1821. 10.1002/hyp.7940.

King, J.; Roche, W. (2008). Aspects of anadromous Allis shad (Alosa alosa Linnaeus) and Twaite shad (Alosa fallax Lacepede) biology in four Irish Special Areas of Conservation (SACs): status, spawning indications and implications for conservation designation. Hydrobiologia 602, 145–154.

Kongsberg (2024a). *EM 2040 MKII multibeam echo sounder*. Kongsberg Discovery. Retrieved August 1, 2024, from https://www.kongsberg.com/discovery/seafloor-mapping/em/EM2040-Mk2/

Kongsberg (2024b). *HiPAP*. Kongsberg Discovery. Retrieved August 1, 2024, from https://www.kongsberg.com/discovery/navigation-positioning/hipap/

Langston RHW, Teuten E & Butler A (2013). Foraging ranges of northern gannets Morus *bassanus* in relation to proposed offshore wind farms in the UK: 2010-2012. RSPB document produced as part of the UK Department of Energy and Climate Change's offshore energy Strategic Environmental Assessment programme, 74pp

Lewis, L. J., Burke, B., Fitzgerald, N., Tierney, T. D. & Kelly, S. (2019). Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10–2015/16. Irish Wildlife Manuals, No. 106. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

Maitland PS & Hatton-Ellis TW (2003). Ecology of the Allis and Twaite Shad. Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough.

Marine Institute, VMS Fisheries Data for 2015-2019, obtained from Marine Institute and mapped by DP Energy, 2021

Marine Traffic (2021), https://www.marinetraffic.com/en/ais/home/centerx:-6.2/centery:52.5/zoom:9

NOAA (2016). Ocean Noise Strategy Roadmap. https://cetsound.noaa.gov/road-map

Nowacek, D.B., Thorne, L.H., Johnston, D.W., and Tyack, P.L. (2007). Response of cetaceans to anthropogenic noise. Mammal Review 37 (2): 81-115.

NPWS (2022). National Parks and Wildlife Service Special Areas of Conservation Portal. https://www.npws.ie/protected-sites/sac [Accessed June 2022].

NPWS (2022). National Parks and Wildlife Service Special Protection Areas Portal. https://www.npws.ie/protected-sites/spa [Accessed June 2022].

NPWS (2023). North West Irish Sea cSPA. Site Synopsis. National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004236.pdf [Accessed September 2023].

Office of the Planning Regulator, March 2021 OPR Practice Note PN01

Pace, F., C. Robinson, C.E. Lumsden, and S.B. Martin (2021). Underwater Sound Sources Characterisation Study: Energy Island, Denmark. Document 02539, Version 2.1. Technical report by JASCO Applied Sciences for Fugro Netherlands Marine B.V.

Parvin S. J., Nedwell J. R. and Harland E. (2007). Lethal and physical injury of marine mammals, and requirements for Passive Acoustic Monitoring. Subacoustech Report 565R0212, report prepared for the UK Government Department for Business, Enterprise and Regulatory Reform.

Phillips JA, Guilford T, Fayet AL. How do resource distribution and taxonomy affect the use of dual foraging in seabirds? A review. Behav Ecol. 2023 Jul 11;34(5):769-779. doi: 10.1093/beheco/arad052. PMID: 37744167; PMCID: PMC10516677.

Popper, A. N. (2003). Effects of Anthropogenic Sound on Fishes. Fisheries,28:10,24-31, DOI: 0.1577/1548-8446(2003)28[24:EOASOF] 2.0.CO;2

Popper, A. N., Dennis T.T. Plachta, Mann, D A., and Higgs, D. (2004) Response of clupeid fish to ultrasound: a review, ICES Journal of Marine Science, Volume 61, Issue 7, Pages 1057–1061.

Popper, AN and Hawkins, AD. (2019). An overview of fish bioacoustics and the impacts of anthropogenic sounds on fish. J Fish Biol.; 94: 692– 713. https://doi.org/10.1111/jfb.13948

Arthur N. Popper, Lyndie Hice-Dunton, Edward Jenkins, Dennis M. Higgs, Justin Krebs, Aran Mooney, Aaron Rice, Louise Roberts, Frank Thomsen, Kathy Vigness-Raposa, David Zeddies, Kathryn A. Williams; Offshore wind energy development: Research priorities for sound and vibration effects on fishes and aquatic invertebrates. *J. Acoust. Soc. Am.* 1 January 2022; 151 (1): 205–215. https://doi.org/10.1121/10.0009237

Putland, RL, Montgomery, JC and Radford, CA. (2018). Ecology of fish hearing. J Fish Biol.; 95: 39– 52. https://doi.org/10.1111/jfb.13867

Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Richardson, W.J.; Greene Jr., C.R.; Malme, C.I.; Thomson, D.H. (1995). Marine mammals and noise. Academic Press: San Diego. ISBN 0-12-588441-9

Rikardsen, A. H., Righton, D., Strøm, J. F., *et al.* (2021). Redefining the oceanic distribution of Atlantic salmon. *Sci Rep* **11**, 12266 https://doi.org/10.1038/s41598-021-91137-y

Rogers, P.H., A.D. Hawkins, A.N. Popper, R.R. Fay, and M.D. Gray. 2016. Parvulescu revisited: small tank acoustics for bioacousticians. In: The effects of noise on aquatic life II, edited by A.N. Popper, and A. D. Hawkins. Springer Science+Business Media, New York.

Ruppel, C. D., Weber, T. C., Staaterman, E. R., Labak, S. J., & Hart, P. E. (2022). Categorizing active marine acoustic sources based on their potential to affect marine animals. *Journal of Marine Science and Engineering, 10*(9), 1278. https://doi.org/10.3390/jmse10091278

R2Sonic. (2024). *Sonic 2024 multibeam echosounder (MBES)*. R2Sonic. Retrieved August 1, 2024, from https://r2sonic.com/products/sonic-2024/

S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. http://www.irishstatutebook.ie/eli/2011/si/477/made/en/print

Schoeman R.P., Patterson-Abrolat C. and Plön S. (2020) A Global Review of Vessel Collisions with Marine Animals. Front. Mar. Sci. 7:292. doi: 10.3389/fmars.2020.00292

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., and Tyack, P. L. (2007). Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals 33(4): 411-521.

Southall, Brandon, Finneran, James, Reichmuth, Colleen, Nachtigall, Paul, Ketten, Darlene, Bowles, Ann, Ellison, William, Nowacek, Douglas, Tyack, Peter (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals. 45. 125-232. 10.1578/AM.45.2.2019.125.

Thaxter CB, Lascelles B, Sugar K, ASCP Cook, Roos S, Bolton M, Langston RHW & Burton NHK (2012). Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. Biological Conservation 156: 53–61.

Thaxter CB, Ross-Smith VH, Clark NA, Conway GJ, Johnston A, Wade HM, Masden EA, Bouten W & Burton NHK (2014). Measuring the interaction between marine features of Special Protection Areas with offshore windfarm development sites through telemetry: final report. Report for the Department of Energy and Climate Change.

Thaxter CB, Scragg ES, Clark NA, Clewley G, Humphreys EM, Ross-Smith VH, Barber L, Conway GJ, Harris SJ, Masden EA, Bouten W and Burton NHK (2018). Measuring the interaction between Lesser

Black-backed Gulls and Herring Gulls from the Skokholm and Skomer SPA and Morecambe Bay SPA and offshore wind farm development sites: final report. BTO Research Report No. 702, 162pVotier SC,

Tyler-Walters H., Hiscock K. (eds), Tillin, H.M., Stamp, T., *et al*. (2024) *Marine Life Information Network: Biology and Sensitivity Key Information Review Database* [on-line]. Plymouth: Marine Biological Association of the United Kingdom. Available from: www.marlin.ac.uk

Tyler-Walters, H., Williams, E., Mardle, M.J. and Lloyd, K.A., 2022. Sensitivity Assessment of Contaminant Pressures – Rapid Evidence Assessment (REA) – Protocol. MarLIN (Marine Life Information Network), Marine Biological Association of the UK, Plymouth, pp.18. https://www.marlin.ac.uk/publications

Tyler-Walters, H., Williams, E., Mardle, M.J. and Lloyd, K.A., 2022. Sensitivity Assessment of Contaminant Pressures – Approach Development, Application, and Evidence Reviews. MarLIN (Marine Life Information Network), Marine Biological Association of the UK, Plymouth, pp. 192. https://www.marlin.ac.uk/sensitivity/SNCB-benchmarks

Venn-Watson S, Garrison L, Litz J, Fougeres E, Mase B, Rappucci G, Stratton E, Carmichael R, Odell D, Shannon D, Shippee S, Smith S, Staggs L, Tumlin M, Whitehead H, Rowles T. Demographic clusters identified within the northern Gulf of Mexico common bottlenose dolphin (Tursiops truncates) unusual mortality event: January 2010-June 2013. PLoS One. 2015 Feb 11;10(2):e0117248. doi: 10.1371/journal.pone.0117248. PMID: 25671657; PMCID: PMC4324990.

Teri RowlesWakefield ED, Cleasby IR, Bearhop S, Bodey TW, Davies R, Miller PI, Newton J, Votier SC & Hamer KC (2015). Long-term individual foraging site fidelity – why some gannets don't change their spots. Ecology 96: 3058–3074.

Wakefield ED, Owen E, Baer J, Carroll MJ, Daunt F, Dodd SG, Green JA, Guilford T, Mavor RA, Miller PI, Newell MA, Newton SF, Robertson GS, Shoji A, Soanes LM, Votier SC, Wanless S & Bolton M (2017). Breeding density, fine-scale tracking and large-scale modelling reveal the regional distribution of four seabird species. Ecological Applications 27: 2074-2091.

Wang, C., Lyons, S. B., Corbett, J. J., and Firestone, J. (2007). Using Ship Speed and Mass to Describe Potential Collision Severity with Whales: an Application of the Ship Traffic, Energy and Environment Model (STEEM) [Report by the University of Delaware].

Wind Energy Ireland, 2023. Impact of geophysical and geotechnical site investigation surveys on fish and shellfish [Report by Bluewise Marine]

Woodward, I., Thaxter, C.B., Owen, E., and Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening. BTO research report number 7.ghe

APPENDIX A BIRD ZONE OF INFLUENCE RATIONALE

Data on foraging movements of a number of seabird species has increased over the years mainly due to technological data capture systems such as satellite and other tracking technologies (e.g. Langston et al. 2013, Wakefield et al. 2015, 2017, Thaxter et al. 2014, 2018, Cleasby et al. 2015, 2020, Bogdanova et al. 2017, Carter et al. 2016, EPA et al. 2016, Votier et al. 2017). Available information on foraging areas used by species from particular colonies is still limited. Woodward et al. (2019) have reported on representative breeding season foraging ranges for a range of species.

Table 7-1 provides indicative foraging ranges (mean maximum) travelled for a range of seabird species from a breeding colony to a foraging area, which have been used to identify relevant sites on the basis that related Qualifying Interests could interact with the Maritime Usage Licence Area during site investigation activities. The mean maximum foraging range values are used to address potential interaction with relevant SPAs; as it provides the mean across the maximum foraging distances for each colony within the study. This is a highly precautionary range for foraging distances as it used the maximum range as a basis of the calculation for each species and deemed appropriate foraging ranges in identifying potential for Likely Significant Effects (LSEs). It should be noted however, bird density will not be continuous throughout this range and these measurements is based on seabirds flying long distances around major land masses. It is unlikely that seabirds would travel across land or extremely large distances during chick-rearing stages of the breeding season in order to forage in an offshore site where site investigation activities are occurring. Other ways of representing foraging ranges (e.g. the mean, or percentage foraging area derived from kernel analyses) may therefore provide more useful information, where available.

Whilst applying mean maximum foraging radius would encompass the majority of a population's home-range area, the overall size of the predicted foraging areas around the colony would potentially make it too large to be a useful management tool, without further refinement using habitat and bathymetric data (Soanes et al. 2016). Similarly, the assumption that seabirds are uniformly distributed out to some threshold distance from their colonies, such as their putative maximum foraging range, is unrealistic. Seabird density declines with distance from the colony with density-dependent competition, coastal morphology and habitat preferences (Wakefield et al. 2017), for example oceanographic features at which seabirds preferentially forage including shelf-edge fronts, upwelling and tidal-mixing fronts, offshore banks and internal waves, regions of stratification, and topographically complex coastal areas subject to strong tidal flow (Cox et al. 2018), resulting in highly non-uniform distributions. While Critchley et al. (2018) used a distance-weighted foraging radius

approach to project distributions at sea for a wide range of seabird species during the breeding season, the authors recognised the limitations of not considering environmental variables that contribute to such non-uniform distributions noted above.

The selection of all sites outlined in Section 4 within the mean maximum foraging range of the Maritime Usage Licence Area is a useful but simplistic approach to identifying relevant sites. The approach taken here has been to review the initial selection of sites on this basis and use expert judgement to exclude those for which an interaction would be unrealistic. For example, sites where Fulmar is identified as a Qualifying Interest on the far north and west of Ireland as Fulmar's are highly pelagic seabirds and are highly unlikely to move large distances over land which could bring them to within the Maritime Usage Licence Area. The potential mean maximum foraging range for this species has therefore been applied across the marine area, including where birds could move around headlands.

To aid in the selection process in identifying the mean maximum foraging ranges for the relevant SPAs within the zone of influence of the Maritime Usage Licence Area and the investigation activities measurements were taken across landward distance, seaward distance and some measured across headlands where there were large areas of land that could be covered. This process was used to ensure all distance measurements and foraging ranges were considered in the assessment and screening process for the seabird ranges that were identified from Woodward et al., 2019).

Table 7-1 Indicative breeding season foraging ranges (in bold) (Woodward et al, 2019) and associated confidence levels.

Indicative breeding season foraging ranges		
Species	Mean maximum[1] (km ± SD)	Confidence Level[2]
Eider	**21.5**	Poor
Red-throated diver	**9**	Low
Fulmar	**542.3** ± 657.9	Good
Manx shearwater	**1,346.8** ±,1,018.7	Moderate
European storm petrel	**336**	Poor
Leach's storm petrel	n/a	Moderate
Gannet	**315.2** ± 194.2	Highest
Cormorant	**25.6** ± 8.3	Moderate
Shag	**13.2** ± 10.5	Highest
Arctic skua	n/a	Poor
Great skua	**443.3** ± 487.9	Uncertain
Black-headed gull	**18.5**	Uncertain
Common gull	**50**	Poor
Mediterranean gull	**20**	Uncertain
Herring gull	**58.8** ± 26.8	Good
Lesser black-backed gull	**127** ± 109	Highest

Indicative breeding season foraging ranges		
Species	Mean maximum[1] (km ± SD)	Confidence Level[2]
Kittiwake	**156.1** ± 144.5	Good
Sandwich tern	**34.3** ± 23.2	Moderate
Roseate tern	**12.6** ± 10.6	Moderate
Common tern	**18.0** ± 8.9	Good
Arctic tern	**25.7** ± 14.8	Good
Little tern	**5**	Moderate
Guillemot	**73.2** ± 80.5	Highest
Razorbill	**88.7** ± 75.9	Good
Puffin	**137.1** ± 128.3	Good

[1]The maximum range reported in each study averaged across studies.

[2] Confidence levels were assigned as follows: highest (based on >5 direct studies, graphs and standard deviation suggest relatively low variability between sites and hence higher confidence); good (based on >5 direct studies; graphs and standard deviation show wider variability between sites, hence lower confidence); moderate (between 2-5 direct studies); low (indirect measures or only one direct tracking study); uncertain (survey-based estimates); poor (few survey estimates or speculative data available)

GLOBAL PROJECT REACH

Offices

Dublin (Head Office)
Gavin & Doherty Geosolutions
[redacted]

Belfast
Gavin & Doherty Geosolutions (UK) Limited
[redacted]

Cork
Gavin & Doherty Geosolutions
[redacted]

Edinburgh
Gavin & Doherty Geosolutions (UK) Limited
[redacted]

London
Gavin & Doherty Geosolutions (UK) Limited
[redacted]

Rhode Island
Gavin & Doherty Geosolutions Inc.
[redacted]

Utrecht
Gavin & Doherty Geosolutions
[redacted]

GDG
GAVIN & DOHERTY
GEOSOLUTIONS

Website: www.gdgeo.com
Email: i[redacted]

A Venterra Group Plc
Member Company