14. SHIPPING AND NAVIGATION

14.1 Introduction

This Section of the Environmental Impact Assessment Report (EIAR) will consider the likely effects of the Offshore Site (as detailed in Chapter 5) on Shipping and Navigation during the construction, operation and maintenance and decommissioning phases. Where required, mitigation is proposed, and the residual effects and their significance are assessed. Potential cumulative and transboundary impacts are also considered.

For the purpose of this EIAR, the assessment of Shipping and Navigation considers the following groups or receptors identified in the consultative process and otherwise as part of the assessment for potential effects:

- Commercial vessels;
- Commercial fishing vessels in transit;
- Recreational vessels;
- Military vessels;
- Anchored vessels;
- Local ports and related services; and
- Emergency responders.

The information presented in this Chapter draws on the outcomes of other impact assessments undertaken for the following Chapter assessed independently as part of this EIAR, including;

- Chapter 13: Commercial Fisheries.

Impacts to commercial fishing vessels engaged in active fishing within the marine environment are not considered as part of the Shipping and Navigation assessment, and instead are assessed independently as part of this EIAR in the following Chapter:

- Chapter 13: Commercial Fisheries.

Anatec Ltd is the sole contributor to the Shipping and Navigation assessment and has prepared this EIAR chapter.

14.1.1 Statement of Authority

This chapter has been prepared by Anatec Ltd. Anatec Ltd has vast experience of undertaking Shipping and Navigation assessments for offshore wind farm developments; the Project leads have over 20 years of experience undertaking risk assessments throughout the marine sector including in the oil and gas, subsea, and renewables sectors. These include other recently submitted wind farm developments in Irish waters, such as Codling Wind Park, Arklow Bank Wind Park 2, and the North Irish Sea Array. Anatec Ltd has also undertaken the site-specific vessel traffic surveys for the Project, and again has vast experience of collecting, processing, and analysing vessel traffic data to inform Shipping and Navigation assessments.

14.1.1.1 Samantha Westwood (BSc (Hons) Shipping and Port Operations)

Sam has 25 years' experience within the maritime industry dealing with port and vessel operations as well as offshore installations. Since joining the marine consultancy industry, Sam has been actively involved in the majority of offshore renewable projects in the United Kingdom (UK), as well as projects

across Europe, US, Asia and Australia. Pre consent expertise includes as a marine navigation advisor for offshore developments, hazard assessments and workshops, spatial planning, individual site design, stakeholder management and mitigation strategies. Sam has managed Navigational Risk Assessments (NRA) undertaken as part of the wider consenting process for various projects including Ireland Phase One, The Crown Estate (TCE) Rounds 3/4, ScotWind, and Innovation and Targeted Oil and Gas (INTOG). For the Project, Sam has managed the undertaking of the Shipping and Navigation assessment across this chapter and the NRA.

14.1.1.2 James Milne (BSc (Hons) Mathematics)

James has been involved in navigational risk in the marine sector for the last nine years, with experience primarily in the renewable energy industry, and specifically offshore wind farms. James is experienced with considering the viability of potential sites for Shipping and Navigation with consideration of available baseline sources, consideration of relevant guidance, and an understanding of likely stakeholder concerns. James has managed the completion of the NRA for various projects inclusive of vessel traffic analysis, quantitative modelling of future case scenarios and organising stakeholder consultation. Such projects have included Ireland Phase One, TCE Rounds 3/4, ScotWind, and INTOG. For the Project, James has managed the undertaking of the Shipping and Navigation assessment across this chapter and the NRA.

14.2 Legislation, Policy and Guidelines

In addition to the overarching legislation, policy and guidance documents which are applicable to the EIAR as a whole (as summarised in Chapter 2: Background and Policy), the following legislation, policy and guidance documents are considered relevant to the assessment of potential effects of the Offshore Site on Shipping and Navigation at the time of writing.

14.2.1 Legislation

The legislation that is applicable to the assessment of Shipping and Navigation is summarised below.

- United Nations Convention on the Law of the Sea (UNCLOS) (United Nations (UN), 1982);
- Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1972/77);
- International Convention for the Safety of Life at Sea (SOLAS) Chapter V (IMO, 1974); and
- International Convention for the Prevention of Pollution from Ships (MARPOL) (IMO, 1973/78).

14.2.2 Policy

The key policy that is applicable to the assessment of Shipping and Navigation is summarised in Table 14-1.

Table 14-1 Key Policies Relevant to the Assessment

Policy	Relevance to the assessment
National Marine Planning Framework (2021)	**Ports, Harbours and Shipping Policy 1:** To provide for shipping activity and freedom of navigation the following factors will be taken into account when reaching decisions regarding development and use: - The extent to which the locational decision interferes with existing or planned routes used by shipping, access to ports and harbours and navigational safety.

Ports, Harbours, and Shipping	This includes commercial anchorages and approaches to ports as well as key littoral and offshore routes; › A mandatory NRA; › Where interference is likely, whether reasonable alternatives can be identified; and › Where there are no reasonable alternatives, whether mitigation through measures adopted in accordance with the principles and procedures established by the IMO can be achieved at no significant cost to the shipping or ports sector.
	Ports, Harbours and Shipping Policy 2: Proposals that may have a significant impact upon current activity and future opportunity for expansion of port and harbour activities should demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate significant adverse impacts, d) if it is not possible to mitigate significant adverse impacts on current activity and future opportunity for expansion of port and harbour activities, proposals should set out the reasons for proceeding.
	Ports, Harbours and Shipping Policy 3: Proposals that may have a significant impact upon current activity and future opportunity for expansion of port and harbour activities must demonstrate consideration of the National Ports Policy, the National Planning Framework, and relevant provisions related to the TEN-T network.
	Ports, Harbours and Shipping Policy 4: Proposals within ports limits, beside or in the vicinity of ports and / or that impact upon the main routes of significance to a port must demonstrate within applications that they have: › Been informed by consultation at pre-application stage or earlier with the relevant port authority, and; › Have carried out an NRA including an analysis of maritime traffic in the area, and; › Have consulted the Department of Transport (DoT), Marine Survey Office (MSO), and Irish Lights. › Applicants must continue to engage parties identified in pre-application processes as appropriate during the decision-making process.
National Marine Planning Framework (2021) Safety at Sea	**Safety at Sea Policy 1**: Proposals for installation, operation and maintenance, and decommissioning of offshore wind farms must demonstrate how they will: › Minimise navigational risk between commercial vessels arising from an increase in the density of vessels in maritime space as a result of wind farm layout; › Allow for recreational vessels within the Offshore Wind Farm (including consideration of turbine height) or redirect recreational vessels, minimising navigational risk arising between recreational and commercial vessels.
	Safety at Sea Policy 2: Proposals for offshore renewable energy infrastructure that have the potential to significantly reduce under-keel clearance must demonstrate how they will, in order of preference (a) avoid, (b) minimise, (c) mitigate adverse impacts, or (d) if it is not possible to mitigate significant adverse impacts, proposals should set out the reasons for proceeding.
	Safety at Sea Policy 3: All proposals for temporary or permanent fixed infrastructure in the maritime area must ensure navigational marking in accordance

	with appropriate international standards and ensure inclusion in relevant charts where applicable.
	Safety at Sea Policy 4: Establishing, changing or disestablishing Aids to Navigation (AtoN) must be sanctioned, in advance of works, by Irish Lights.
	Safety at Sea Policy 5: Proposals must identify their potential impact, if any, on Maritime Emergency Response (Search and Rescue (SAR), Maritime Casualty and Pollution Response) operations. Where a proposal may have a significant impact on maritime SAR it must demonstrate how it will, in order of preference (a) avoid, (b) minimise, (c) mitigate adverse impacts, or (d) if it is not possible to mitigate significant adverse impacts, proposals should set out the reasons for proceeding, supported by parties responsible for maritime SAR.
Offshore Renewable Energy Development Plan (2014) Ports, Shipping and Navigation	**Displacement of Shipping** › Where feasible site devices away from constraints and areas of high vessel densities. › Undertake an NRA which should include a survey of all vessels in the vicinity of the proposed development.
	Reduced Visibility › Avoiding areas of high vessel densities and areas constrained by land e.g. adjacent to the entrances of port and Lochs. › In busy shipping areas, potential effects may be reduced by minimising the period of installation, the number of vessels required, and the area occupied during installation would reduce the potential impact on visibility. › Any vessels and devices should be lit and marked in accordance with the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) guidelines, in agreement with Irish Lights.
	Collision Risk › Avoid constrained areas or areas of high shipping densities and regularly used shipping routes. › In busy shipping areas, potential effects may be reduced by minimising the period of installation, the number of vessels required, and the area occupied during installation. › Maintain good communications with the relevant ports, and issue the appropriate notifications during installation, maintenance, and decommissioning. › The scale of potential effect on navigation should be assessed as part of the Environmental Impact Assessment Report (EIAR) and NRA as outlined above.
Offshore Renewable Energy Development Plan (2014) Recreation and Tourism	**Access Restrictions** › Undertake construction, where possible, outside of peak tourist seasons (June to September) to minimise disruption to visitors and local people. › Identify and avoid popular routes for sailing or other water sports such as kayaking. › Where possible, facilitate safe access through arrays for sailing or other water sports.
	Safety and Collision Risk

	› Avoid popular cruising routes, diving areas and key water sport locations. › Incorporate suitable safety features such as lighting, netting and buoys into the device design. › Provide suitable information for the public regarding safety. › Restrict access to construction sites. › Observe good practice during construction, removal and maintenance.

14.2.3 Guidance

Draft guidance for undertaking Shipping and Navigation risk assessment for offshore wind farm developments was published by the DoT for consultation in January 2024 consisting of the main document – Marine Navigational Safety & Emergency Response Risk of Offshore Renewable Energy Installations (OREI) (DoT, 2024) – and annexes covering the NRA methodology and SAR. The draft guidance is based on the principles of the UK's Marine Guidance Note (MGN) 654 (Maritime and Coastguard Agency (MCA), 2021), with the introduction stating that the MCA gave permission for MGN 654 to be used when compiling the draft guidance. A final version of the guidance is not anticipated until later in 2024 at the earliest, and therefore it is deemed appropriate to apply the principles of MGN 654 in the assessment of Shipping and Navigation.

MGN 654 requires use of the IMO Formal Safety Assessment (FSA) (IMO, 2018). Therefore, the FSA has been used to assess impacts to Shipping and Navigation receptors rather than the standard EIA methodology used elsewhere in the EIAR. Further details on the FSA are provided in Section 14.4.

Other key guidance documents considered are as follows (noting this includes certain UK guidance where directed by MGN 654 as above):

- Guidance on Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) Preparation for Offshore Renewable Energy Projects (Department of Communications, Climate Action and Environment (DCCAE), 2017);
- MGN 372 Amendment 1 Guidance to Mariners Operating in the Vicinity of UK OREIs (MCA, 2022);
- IALA Recommendation O-139 and Guidance G1162 on the Marking of Man-Made Offshore Structures (IALA, 2021b/2021a); and
- The Royal Yachting Association's (RYA) Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy. 5th Edition (RYA, 2019).

14.3 Scoping and Consultation

Stakeholder consultation has been ongoing throughout the EIAR preparation and has played an important part in ensuring the scope of the baseline characterisation and impact assessment are appropriate with respect to the Offshore Site and the requirements of the regulators and their advisors. It is acknowledged that consultation with MSO (as part of the DoT's Irish Maritime Administration) and Irish Lights is required under Ports, Harbours and Shipping Policy 4 of the National Marine Planning Framework.

The Sceirde Rocks Offshore Wind Farm Scoping Report was submitted to key stakeholders in August 2023. Comments received from the Scoping Opinion which are considered relevant to the assessment of impacts to Shipping and Navigation have been summarised in Table 14-2 below. A high-level response on how and where these comments have been addressed within the Shipping and Navigation chapter are also provided.

Table 14-2 Scoping opinion comments received of relevance to Shipping and Navigation

Consultee	Comment	Where the comment has been addressed in the EIAR
Irish Lights	Irish Lights requested a meeting regarding the Project.	Consultation meetings were held with Irish Lights (see Section 14.3.4).
Irish Aviation Authority (IAA)	IAA recommended that consultation be undertaken with IRCG.	IRCG have been consulted with regarding the Project (see Section 14.3.5).
	IAA requested that, in the event of planning consent being granted, the applicant should be conditioned to contact the IAA to agree an aeronautical obstacle warning light scheme for the Project.	Appendix 5-9: Lighting and Marking Plan (LMP) considers the appropriate IAA guidance.
IRCG	IRCG noted that the EIAR scoping report does not take into account the contents of the National Maritime Oil/HNS Spill Contingency Plan and the National SAR plan. Suggested that the EIAR report is updated to include and take account of the contents of the plans.	The National Maritime Oil/HNS Spill Contingency Plan and the National SAR plan are considered within the mitigation laid out in Section 14.6
Irish Sailing Association	Irish Sailing would not have any objections to the Project and that it will not be located within any sailing race zones.	Acknowledged.
	It was recommended that the applicant contact local sailing clubs in the area.	Recreational stakeholders were invited to attend the Hazard Workshop, as detailed within Section 4.2 of Appendix 14-1: NRA.

Additionally, key issues raised by stakeholders during further consultation for the Project are presented for each meeting in the following subsections.

14.3.1 Regular Operators

Using the vessel traffic survey data (see Section 14.4.2), Regular Operators were identified and subsequently provided with an overview of the Project, with the opportunity to provide comment and participate in the Hazard Workshop (see Section 14.3.2).

Given the low levels of commercial traffic in the region, all commercial operators identified in the vessel traffic survey were contacted. The full list of Regular Operators is provided in Appendix 14-1: NRA.

14.3.2 Hazard Workshop

There was limited interest in the Hazard Workshop undertaken in May 2024, with only the Port of Galway attending. The full list of invitees to the Hazard Workshop is provided in Appendix 14-1: NRA.

Nevertheless, Shipping and Navigation hazards (impacts) across the phases of the Offshore Site were identified and discussed, including by vessel type where appropriate.

Key points raised by Port of Galway are summarised below:

- The planned application for the Port of Galway expansion will result in changes to vessel numbers and sizes should the development proceed. The current timeline has the completion of construction in 2030. After construction, cruise vessels will be able to moor at Galway, rather than anchoring further offshore, with the pilot boarding station moved further west.
- The application was submitted in January 2014 with An Bord Pleanála hearing in 2015. The application remains undecided in the planning system.
- Several subsea cables should be considered including the operational IRIS cable (from Iceland), and the proposed PISCES (from Portugal), and Far North Fibre (from Canada/Japan) cables, both in the planning stage.
- Imports of alternative fuels to Galway have begun, with a potential supply from Nordic countries which would change the traffic patterns for tankers, i.e., transits through the North Sound similar to those currently recorded for cargo vessels.
- During installation works for the subsea cables there may be navigational safety risk for fishing vessels, but this would no longer be the case post installation. Previous experience of cable laying in the region was positive given the level of consultation with local fishermen.
- Recreational traffic is very weather dependent and will likely increase in the future due to the marina in Rossaveel and new leisure craft facilities constructed at Kilronan.
    -
    - Following the Hazard Workshop, the risks (effects) associated with the identified hazards (impacts) were ranked in the hazard log with appropriate embedded mitigation measures identified. The hazard log was then provided to stakeholders (including those which did not attend) for comment with feedback incorporated into Appendix 14-1: NRA.

The hazard log is provided in full in Annex D of Appendix 14-1: NRA.

14.3.3 Meeting with Rossaveel Harbour

A consultation meeting was held with the Harbour Master for Rossaveel Harbour on 15th May 2024. Although not part of the Hazard Workshop, feedback received was fed into the hazard log process in agreement with the Harbour Master.

Key points raised by Rossaveel Harbour are summarised below:

- There is a preference for a guard vessel to be located on-site while construction is ongoing.
- Content that the continued navigation of fishing vessels internally within the Offshore Array Area (OAA) can be managed through marine coordination.
- No impact on pilotage operations associated with Rossaveel is expected as a result of the Offshore Site.
- The periods for the vessel traffic survey data cover the busy fishing periods in the winter, which run October to April, and the ferry season in the summer.
- Recreational traffic is very limited in the summer and not expected in the winter – the vessel traffic survey data is representative.
- Active fishing is present near the Landfall and is represented by the Automatic Identification System (AIS) data.
- There is a small level of cargo which is transported out of Rossaveel in the summer, headed to the Aran Islands.

14.3.4 Meetings with Irish Lights

A consultation meeting was held with Irish Lights on 22nd November 2023 in which a general overview of the Project was provided and any significant concerns discussed. Irish Lights were comfortable with the Project and mitigations proposed to manage lighting and marking during each phase. A further consultation meeting was held on 17th October 2024 in which Irish Lights noted that an operational buoy may be required to assist nearby routeing vessels maintain a suitable distance from the OAA.

14.3.5 Meeting with Irish Coast Guard

Fuinneamh Sceirde Teoranta (FST) (the Applicant) met with the Irish Coastguard (IRCG) in Dublin on 11th April 2024. The meeting focused on discussion around the Project layout (see Figure 14-1) and SAR access internally within the array. A further meeting was held on 19th July 2024 to discuss IRCG next step requirements. Further discussions are anticipated on an ongoing basis.

14.3.6 Meeting with Marine Survey Office

A consultation meeting was held with the MSO on 27th September 2024. The meeting included an overview of the planned NRA process and high-level review of the baseline conditions.

14.4 Assessment Methodology

This Section provides details relating to the assessment methodology including the approach to the impact assessment, relevant Project design parameters, mitigation measures, and baseline data which has fed into undertaking the impact assessment. Where there is a deviation from standard EIA approach (see Section 14.4.5) this is detailed and justified.

14.4.1 Data and Information Sources

The desktop data sets and literature with relevant coverage to the Project, which have been used to inform the baseline characterisation for Shipping and Navigation are outlined in Table 14-3. It is noted that site-specific surveys are outlined separately in Section 14.4.2.

Table 14-3 Summary of Key Datasets

Title	Source	Year
ShipRoutes database	Anatec	2024
Marine incident data	Royal National Lifeboat Institution (RNLI)	2013-2022 (latest available at time of assessment)
Marine incident data	Marine Casualty Investigation Board (MCIB)	1994-2023 (latest available at time of assessment)
Marine incident data	Marine Accident Investigation Branch (MAIB) incident reports	Various
United Kingdom Hydrographic Office (UKHO) Admiralty charts 1125, 2173, 2420, and 2709	UKHO	2024

Admiralty Sailing Directions Irish Coast Pilot NP40	UKHO	2019 (latest available at time of assessment)
Wind, wave, and tidal stream data	Deltares	2022

14.4.2 Project Site-Specific Surveys

In line with MGN 654 requirements, two site-specific vessel traffic surveys were undertaken:

- 25 August to 08 September 2022 (14 days, summer); and
- 16 to 30 November 2022 (14 days, winter).

Both surveys were shore-based using a location on Mweenish Island from which comprehensive coverage of the OAA could be achieved. This coverage included capture of AIS, Radar, and visual observations, giving a total of 28 full days of vessel traffic movements to characterise the baseline.

A number of vessel tracks recorded during the survey periods were classified as temporary (non-routine), such as the tracks of non-routeing survey vessels. These have therefore been excluded from the analysis. This is a standard approach for traffic analysis, as by their nature non-routine movements can vary significantly and therefore it is not representative to incorporate these into the baseline review. Full details of the vessel traffic survey methodology and associated limitations are provided in Section 5.3 of Appendix 14-1: NRA.

14.4.3 Consideration of Data Sources and Quality

The carriage of AIS is required on board all vessels of greater than 300 Gross Tonnage (GT) engaged on international voyages, cargo vessels of more than 500GT not engaged on international voyages, passenger vessels irrespective of size built on or after 1st July 2002, and fishing vessels over 15 metres (m) in length. Larger vessels were recorded in the vessel traffic surveys on AIS, while smaller vessels without AIS installed (including fishing vessels under 15 m in length and recreational craft) were recorded, where possible, on the Automatic Radar Plotting Aid (ARPA). The summer 2022 survey partially overlapped with the Project's geophysical survey; during this time some small fishing vessels which would typically operate in the OAA were subsequently absent. However, results were discussed with stakeholders including local ports to ensure baseline data was suitable to inform the risk assessment and future case vessel traffic growth has considered any effects on fishing vessel volumes (see Section 14.6.1.2). As the vessel traffic data for the OECC includes vessels transmitting over AIS only, fishing and recreational vessels under 15 m in length may be underrepresented.

The RNLI incident data cannot be considered comprehensive of all incidents in the study area. Although hoaxes and false alarms are excluded, any incident to which a RNLI resource was not mobilised has not been accounted for in this dataset. Similarly, the MCIB incident data only accounts for completed investigations. Any incident that has not been investigated or whose investigation is ongoing was not accounted for. In addition, precise location data is not available for all incidents within the dataset. Incident data relating to IRCG is not publicly available for analysis.

The UKHO Admiralty charts are updated periodically, and therefore the information shown may not reflect the real-time features within the region with total accuracy. Additionally, not all navigational features may be charted, e.g., certain aids to navigation and wrecks. However, during consultation, input has been sought from relevant stakeholders regarding the navigational features baseline.

The data obtained is considered to be sufficient to undertake a robust assessment of the likely significant effects of the Project on Shipping and Navigation.

14.4.4 Impacts Requiring Assessment

All the potential impacts scoped into the Shipping and Navigation assessment are detailed in Table 14-4 below.

Table 14-4 Potential impacts requiring assessment

Potential Impact	Description	Nature of Impact
Potential Impacts during the Construction and Decommissioning phases		
Displacement of third-party vessels and resulting increased collision risk	Activities associated with the construction and decommissioning of structures and cables may displace existing routes/activity and increase encounters and collision risk with other third-party vessels.	Direct
Collision risk between third-party vessels and Project vessels	Vessels associated with construction and decommissioning activities may increase encounters and collision risk for other vessels already operating in the area.	Direct
Reduced access to local ports	Construction and decommissioning activities as well as the presence of surface structures within the OAA may result in reduced access to local ports and harbours for vessels.	Direct
Potential Impacts during the Operation and maintenance phase		
Displacement of third-party vessels and resulting increased collision risk	Activities associated with the operation and maintenance phase of structures and cables may displace existing routes/activity and increase encounters and collision risk with other third-party vessels.	Direct
Collision risk between third-party vessels and Project vessels	Vessels associated with operation and maintenance phase activities may increase encounters and collision risk for other vessels already operating in the area.	Direct
Reduced access to local ports	Operation and maintenance phase activities as well as the presence of surface structures within the OAA may result in reduced access to local ports and harbours for vessels.	Direct
Creation of third-party allision[1] risk	Presence of structures within the OAA will lead to creation of powered, drifting, and internal allision risk for vessels.	Direct
Reduction in emergency response capability	Presence of structures, increased vessel activity and personnel numbers may reduce emergency response capability by increasing the number of	Direct

[1] *The act or process of a moving object striking a stationary object, whereas a collision involves two moving objects.*

Potential Impact	Description	Nature of Impact
	incidents, increase consequences or reducing access for the responders.	
Potential Impacts during the Operation and maintenance and Decommissioning phases		
Reduction in under-keel clearance due to cable protection	The presence of protection over subsea cables may reduce charted water depths leading to increased risk of under-keel interaction for passing vessels.	Direct
Anchor interaction with subsea infrastructure	Presence of export cables and inter-array cables (IAC) may increase the potential for interaction with subsea cables.	Direct

14.4.5 Characterisation of Impacts and Effects

An assessment of potential impacts is provided separately in Section 14.6 for the construction, operation and maintenance, and decommissioning stages.

The criteria for the assessment of Shipping and Navigation differ from those set out in Chapter 4: Environmental Impact Assessment (EIA) Methodology, noting that the FSA methodology required by MGN 654 – and which is the internationally recognised approach for assessing Shipping and Navigation impacts – has been applied.

There are differences between standard EIAR terminology applied for other offshore topics and FSA terminology applied for Shipping and Navigation. This chapter adapts the standard EIA terminology where possible (whilst maintaining the overarching IMO FSA methodology), whilst Appendix 14-1: NRA uses FSA terminology throughout. The key differences in terminology are summarised in Table 14-5.

Table 14-5 Summary of Differences in Terminology Between EIAR and NRA

EIAR Term	NRA Term	Definition
Impact	Hazard	A potential threat to human life, health, property, or the environment.
Effect	Risk	The combination of frequency of occurrence and severity of consequence of an impact.
Receptor	User	Sufferer of effect.
Mitigation by design	Mitigation measure	A commitment made by the Developer to reduce and/ or eliminate the potential for significant effects.

For each potential impact, the assessment identifies receptors sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts on given receptors based on two key factors – the frequency of occurrence and severity of consequence. The definitions of frequency of occurrence and severity of consequence for the purposes of the Shipping and Navigation assessment are provided in Table 14-6 and Table 14-7, respectively. This differs from the standard EIA approach of considering sensitivity of the receptor and magnitude of the impact to determine the

significance of effect. This deviation is applied due to the application of FSA being widely recognised by industry and "aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and cost-benefit assessment" (IMO, 2018).

Table 14-6 Frequency Criteria

Frequency of Occurrence	Definition
Frequent	Yearly.
Reasonably Probable	One occurrence per 1 to 10 years.
Remote	One occurrence per 10 to 100 years.
Extremely Unlikely	One occurrence per 100 to 10,000 years.
Negligible	Less than one occurrence per 10,000 years.

Table 14-7 Consequence Criteria

Severity of Consequence	Definition
Major	More than one fatality, total loss of property, tier 3 national assistance required and international reputational effects.
Serious	Multiple serious injuries or single fatality, damage resulting in critical impact on operations, tier 2 regional assistance required, and national reputational effects.
Moderate	Multiple minor or single serious injury, damage not critical to operations, tier 2 limited external assistance required, and local reputational effects.
Minor	Slight injury to people, minor damage to property, tier 1 local assistance required, and minor reputational effects limited to receptors.
Negligible	No perceptible effect.

The significance of effect is then determined using the matrix provided in Table 14-8, again aligning with MGN 654. Under FSA, the requirement for additional mitigation measures is dependent on the significance of the effects on Shipping and Navigation receptors, e.g., where an impact is deemed Unacceptable, additional mitigation measures need to be incorporated to bring the significance to within As Low As Reasonably Practicable (ALARP) parameters.

Table 14-8 Shipping and Navigation Significance of Effect Matrix

	Frequency of Occurrence					
Severity of		Frequent	Reasonably Probable	Remote	Extremely Unlikely	Negligible
	Major	Unacceptable	Unacceptable	Unacceptable	Tolerable with Mitigation	Tolerable with Mitigation

	Serious	Unacceptable	Unacceptable	Tolerable with Mitigation	Tolerable with Mitigation	Broadly Acceptable
	Moderate	Unacceptable	Tolerable with Mitigation	Tolerable with Mitigation	Broadly Acceptable	Broadly Acceptable
	Minor	Tolerable with Mitigation	Tolerable with Mitigation	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
	Negligible	Tolerable with Mitigation	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable

14.4.6 Project Design Parameters

As outlined in Chapter 4: EIA Methodology, this assessment considers the design of the Project as part of the assessment of likely significant effects on Shipping and Navigation users. The approach to impact assessment within this EIAR assesses the design of the Offshore Site (as detailed in Chapter 5: Project Description). The key Project design details which are considered relevant to the assessment of Shipping and Navigation are detailed in Table 14-9 for each impact and is aligned with both EIA and MGN 654 approaches.

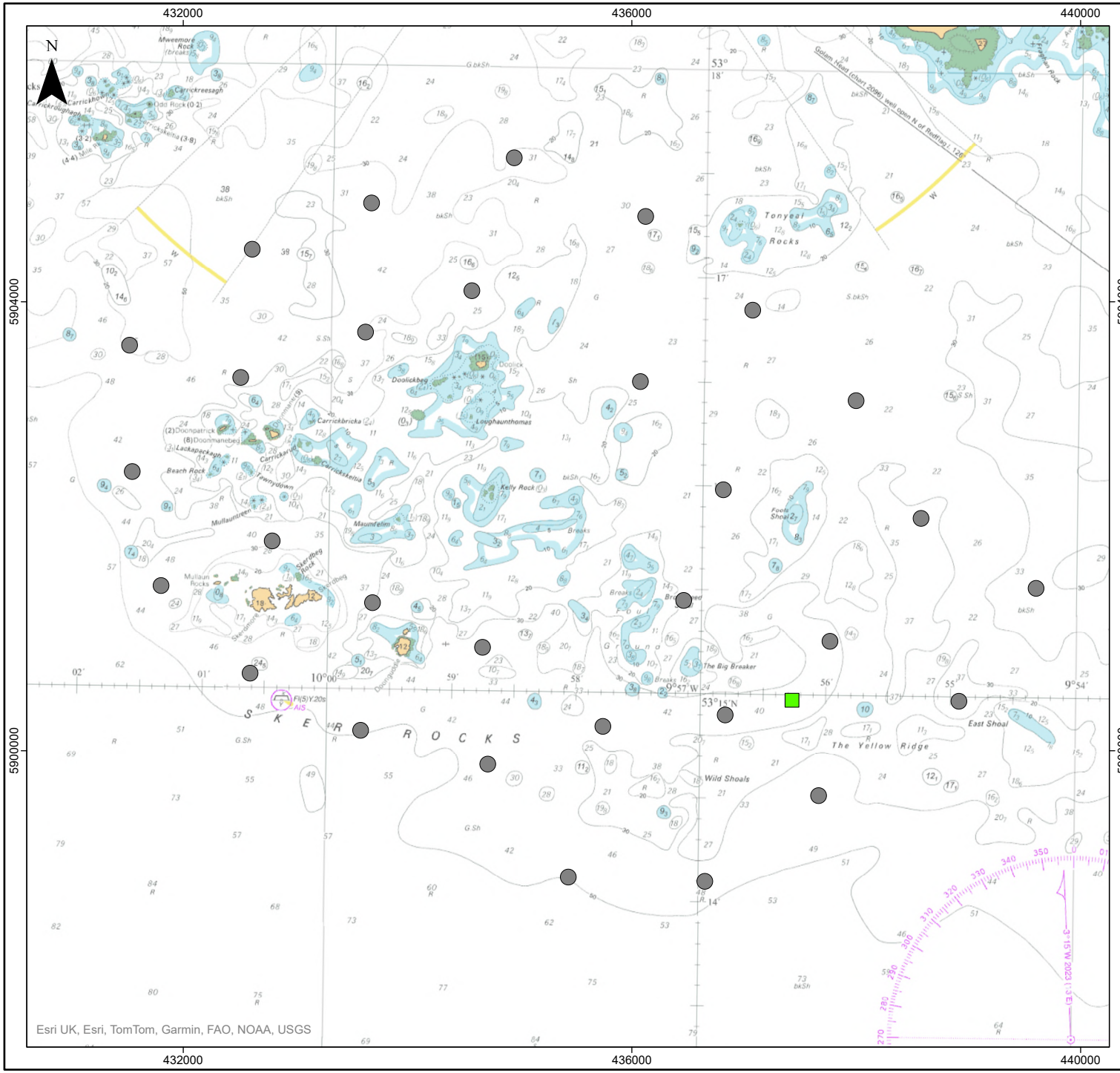
It is acknowledged that should temporary anchorage of gravity base structure (GBS) fixed-bottom foundations be used this will be subject to a separate licencing and consenting procedure and is therefore not considered in detail in this Chapter. However, any such activity would occur within the Shannon Estuary and therefore within an area over which the Shannon Foynes Port Company would have jurisdiction as the Statutory Harbour Authority. With appropriate marine coordination between the Project and the Statutory Harbour Authority – noting that marine coordination for Project vessels is captured as an embedded mitigation measure in Section 14.4.7 – it is expected that any temporary anchorage will not give rise to significant navigational risk.

Table 14-9 Design scenario specific to Shipping and Navigation impact assessment

Potential Impact	Design Scenario	Further information
Construction and decommissioning		
Displacement of third-party vessels and resulting increased collision risk	› Construction/decommissioning phases of up to four years; › Full build out of the OAA; › Buoyed construction/decommissioning area encompassing the maximum extent of the OAA; › Offshore Export Cable (OEC) length of 34 NM (63.5 km); and › A maximum of 11 construction vessels on site on any one day.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement and subsequent collision risk involving third-party vessels.
Collision risk between third-party	› Construction/decommissioning phases of up to four years; › Full build out of the OAA;	Largest possible extent of infrastructure, greatest number of simultaneous

vessels and Project vessels	› Buoyed construction/decommissioning area encompassing the maximum extent of the OAA; › OEC length of 34 NM (63.5 km); and › A maximum of 11 construction vessels on site on any one day.	vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on vessel-to-vessel collision risk involving a third-party vessel and a Project vessel.
Reduced access to local ports	› Construction/decommissioning phases of up to four years; › Full build out of the OAA; › Buoyed construction/decommissioning area encompassing the maximum extent of the OAA; › OEC length of 34 NM (63 km); and › A maximum of 11 construction vessels on site on any one day.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on access to local ports.
Operation and maintenance		
Displacement of third-party vessels and resulting increased collision risk	› Operation and maintenance phase of up to 38 years; › Full build out of the OAA; › Buoyed construction/decommissioning area encompassing the maximum extent of the OAA; › OEC length of 34 NM (63.5 km); and › An average of two operations and maintenance vessels on site on any one day.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement and subsequent collision risk involving third-party vessels.
Collision risk between third-party vessels and Project vessels	› Operation and maintenance phase of up to 38 years; › Full build out of the OAA; › Buoyed construction/decommissioning area encompassing the maximum extent of the OAA; › OEC length of 34 NM (63.5 km); and › An average of two operations and maintenance vessels on site on any one day.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on vessel-to-vessel collision risk involving a third-party vessel and a Project vessel.
Reduced access to local ports	› Operation and maintenance phase of up to 38 years; › Full build out of the OAA; › Buoyed construction/decommissioning area encompassing the maximum extent of the OAA; › OEC length of 34 NM (63.5 km); and › An average of two operations and maintenance vessels on site on any one day.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on access to local ports.
Creation of third-party allision risk	› Operation and maintenance phase of up to 38 years; › Full build out of the OAA;	Largest possible extent of surface infrastructure, greatest number of surface structures, and greatest

	› Total of 30 Wind Turbine Generators (WTG) on GBS foundations with sea surface diameter of 13 m; › Minimum spacing of 1,017 m between WTGs; › Layout as per Figure 14-1; › Minimum blade tip height above HAT of 27.5 m; › One OSS with topside dimensions of 58.5×42.5 m; and › Minimum spacing of 610 m between WTGs and OSS.	duration resulting in the maximum spatial and temporal effect on vessel to structure allision risk.
Reduction in under-keel clearance due to cable protection	› Operation and maintenance phase of up to 38 years; › Total of 39 NM (73 km) of IAC; › Indicative maximum height of IAC protection of 3.4 m (noting that this applies to 14% of the total IAC length); › Indicative maximum proportion of IAC protection requirement of 100%; › OEC length of 34 NM (63.5 km); › Indicative height of OEC protection of 3.4 m (noting that this applies to 2.8% of the total OEC length); › Indicative maximum proportion of OECC requirement of 100%; and › One crossing for the OEC.	Maximum length of subsea cable and maximum extent of protection leading to greatest under keel interaction risk.
Anchor interaction with subsea infrastructure	› Operation and maintenance phase of up to 38 years; › Total of 39 NM (73 km) of IAC; › Indicative maximum height of IAC protection of 3.4 m (noting that this applies to 14% of the total IAC length); › Indicative maximum proportion of IAC protection requirement of 100%; › OEC length of 34 NM (63.5 km); › Indicative height of offshore export cable protection of 3.4 m (noting that this applies to 2.8% of the total OEC length); › Indicative maximum proportion of OEC protection requirement of 100%; and › One crossing for the OEC.	Largest possible extent of subsea infrastructure and greatest duration resulting in the maximum spatial and temporal effect on anchor interaction.
Reduction in emergency response capability	› Operation and maintenance phase of up to 38 years; › Full build out of the OAA; › Total of 30 WTGs on GBS foundations with sea surface diameter of 13 m; › Minimum spacing of 1,017 m between WTGs; and › An average of two operations and maintenance vessels on site on any one day.	Largest possible extent, greatest number of surface structures, greatest number of simultaneous vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on emergency response capability.



SCEIRDE ROCKS WINDFARM

Feirm Ghaoithe Charraigeacha Sceirde

LEGEND

- Wind Turbine Generator
- Offshore Substation

0 0.7 1.4 nm

0 1 2 km

PROJECT TITLE

Sceirde Rocks

MAP TITLE

OAA Layout

VER	REMARKS	DATE	Drawn	Approved
1	FINAL	31/10/2024	DS	AF

DRAWING NO

Figure 14-1

SCALE	PAPER SIZE	DATUM	PROJECTION
1:50,000	A4	WGS 84	UTM 29N

14.4.7 Mitigation by Design

Mitigation measures have been adopted as part of the Project design process in order to reduce the potential for impacts. Those relevant to Shipping and Navigation are outlined in Table 14-10 and have been accounted for in the assessment provided in Section 14.6.

Table 14-10 Embedded Mitigation Measures Relevant to Shipping and Navigation

Mitigation Measure	Details
Advisory safe passing distances	Advisory safe passing distances will be implemented around a construction, maintenance, or decommissioning vessel undertaking ongoing work, as well as operational wind farm assets (i.e. WTG, OSS). It is anticipated that these will include recommended safe clearance of 50m from installed structures, and 500m from construction works or major maintenance activities. It is noted that there is no mechanism for deployment of statutory safety zones in Irish waters and therefore the application of advisory safe passing distances is considered a suitable alternative means of mitigating risk.
Buoyed construction area	A buoyed construction (or decommissioning) area around the OAA will be implemented during the construction phases in agreement with Irish Lights. An LMP which incorporates the buoyed construction area is provided in Appendix 5-9: LMP.
Cable protection	Cable protection (via burial or external protection where burial is not possible) will be implemented and monitored, with any damage, destruction, or decay of cables notified to appropriate regulatory bodies no later than 24 hours after being discovered.
Compliance with MGN 654 and its annexes	The Project will be compliant with UK MGN 654 (MCA, 2021) noting that, as per Section 14.2.3, draft guidance has been published by the DoT for OREIs in Irish waters and closely resembles MGN 654.
Decommissioning Plan	A Decommissioning Plan has been developed and will be updated prior to the start of decommissioning works. This includes details of how the subsea cables and associated protection (left in situ) will be routinely monitored post-decommissioning.
Guard vessel(s)	Where appropriate, guard vessels will be used to ensure adherence with advisory passing distances.
Liaison with IRCG in relation to SAR resources	The Applicant will liaise with the IRCG in relation to SAR resources to ensure suitable emergency response plans and procedures are in place, with consideration of the National SAR Plan (Government of Ireland, 2019).
Lighting and marking	Lighting and marking of the OAA will be in compliance with IALA Recommendation O-139 and Guideline G1162 (IALA, 2021b/2021a) and agreed with Irish Lights. An LMP is provided in Appendix 5-9: LMP.

Marine coordination for Project vessels	Marine coordination will be implemented to manage Project vessel movements.
MPCP	An Marine Pollution Contingency Plan (MPCP) has been developed in accordance with MARPOL requirements outlining procedures to protect personnel working and safeguard the environment should a pollution event occur (Appendix 5-3: MPCP).
Marking on nautical charts	There will be appropriate marking of all offshore infrastructure associated with the Offshore Site on UKHO Admiralty charts.
Minimum blade clearance	There will be a minimum blade clearance of 27.5 m above Highest Astronomical Tide (HAT) which is in line with MGN 654 and RYA recommendations (RYA, 2019).
Project vessel compliance with international marine regulations	All Project vessels will comply with international marine regulations as adopted by the Flag State including the COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974).
Promulgation of information	Information for vessel routes, timings and locations, advisory safe passing distances will be circulated principally via Notices to Mariners but also via any other appropriate media including the Fisheries Liaison Officer (FLO).

14.5 Baseline Characterisation

The baseline characterisation provides a description of the existing nature, extent and location of Shipping and Navigation user operations and activities in relation to the location of Project. The baseline characterisation is informed by site specific survey data and other data sources (Section 14.4.1 and 14.4.2) and outcomes from ongoing consultation with key stakeholders (Section 14.3). By describing existing baseline conditions, it is possible to identify activities and receptor groups which have the potential to be affected by the construction, operation and maintenance and decommissioning of the Offshore Site.

The baseline characterisation considers Shipping and Navigation within an identified study area. The study area is characterised by both the nature and extent of works associated with the construction, operation and maintenance, and decommissioning phases of the Offshore Site. Further details on the study area identified for the assessment of Shipping and Navigation as part of this EIAR is presented in Section 14.5.1 below.

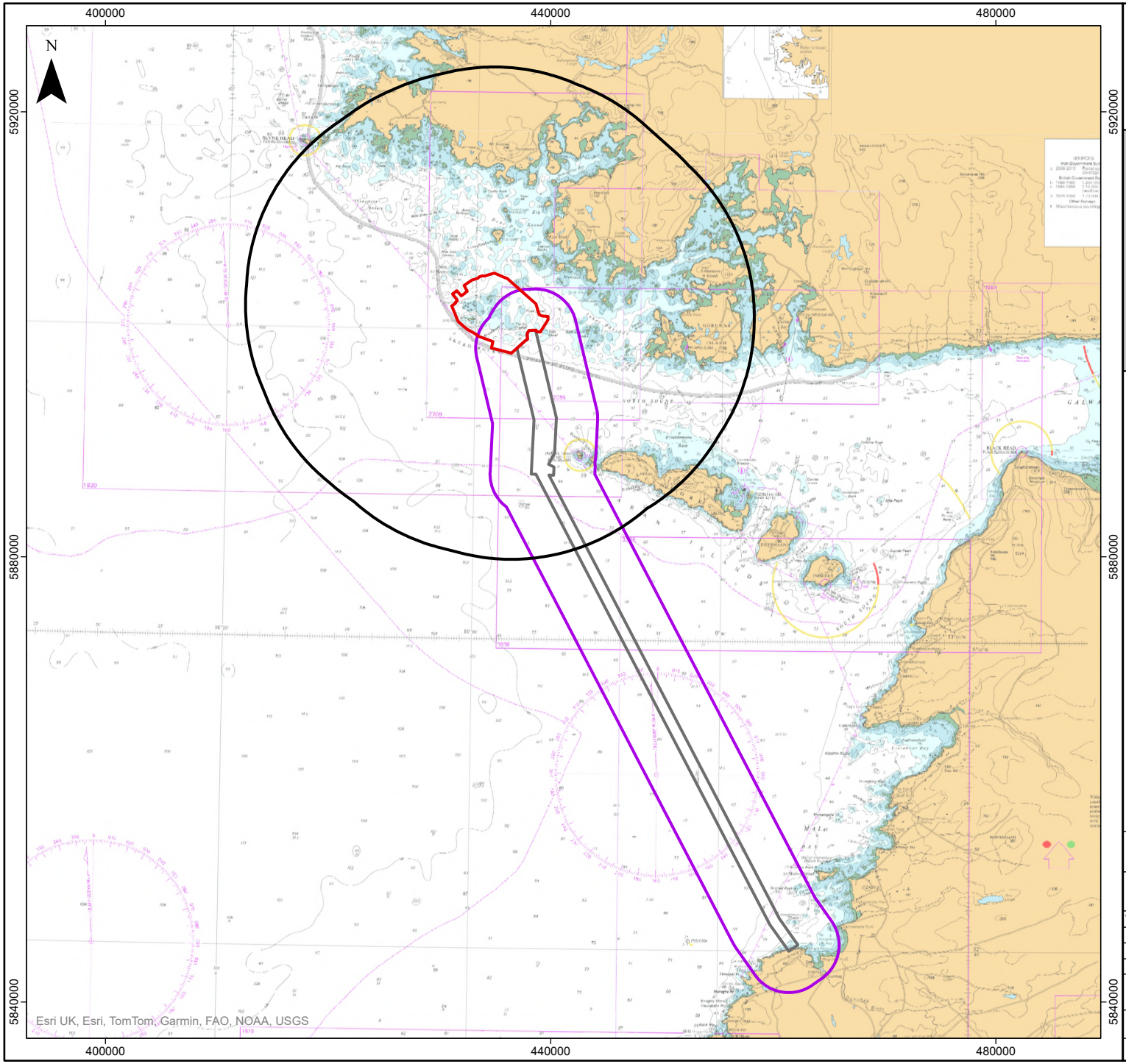
Additional details relating to the baseline environment are provided in Appendix 14-1: NRA.

14.5.1 Study Area

A 10 nautical mile (NM) buffer has been applied around the OAA (hereafter the 'OAA study area'), as presented in Figure 14-2. Using a buffer of 10 NM is standard practice for defining the Shipping and Navigation study area and has been used in the majority of offshore wind farm Shipping and Navigation assessments in Ireland and the UK as it captures relevant routeing in the area that may be affected while still remaining site-specific.

A 2 NM buffer has been applied around the OECC (hereafter the 'OECC study area') in line with best practice as shown in Figure 14-2. As with the OAA study area, this has been defined to capture relevant receptors and their movements within, and near, the OECC.

Navigational features out with these study areas are considered where appropriate and potentially relevant to the assessment. For example, a port may be located outside these study areas but be a frequent destination for vessels navigating within the study areas.



SCEIRDE ROCKS WINDFARM

Feirm Ghaoithe Charraigeacha Sceirde

LEGEND

- Offshore Array Area
- Offshore Array Area Study Area
- Offshore Export Cable Corridor
- Offshore Export Cable Corridor Study Area

0 7 14 nm

0 10 20 km

PROJECT TITLE

Sceirde Rocks

MAP TITLE

Overview of Study Area

VER	REMARKS	DATE	Drawn	Approved
1	FINAL	31/10/2024	DS	AF

DRAWING NO

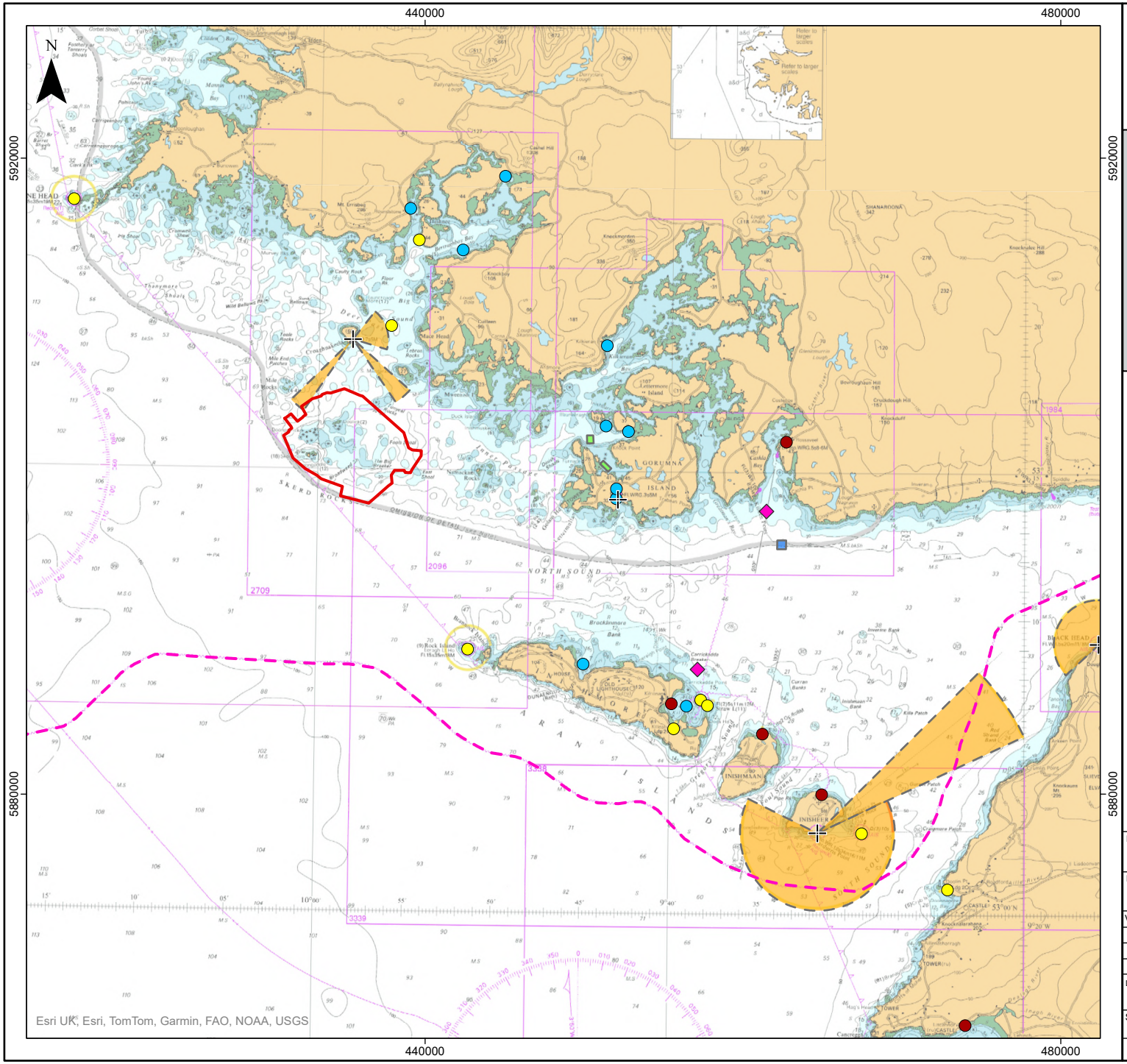
Figure 14-2

SCALE	PAPER SIZE	DATUM	PROJECTION
1:500,000	A4	WGS 84	UTM 29N

14.5.2 Baseline Description

14.5.2.1 Existing Baseline

The baseline navigational features within, and in proximity to, the OAA and OECC are presented in Figure 14-3.



SCEIRDE ROCKS WINDFARM

Feirm Ghaoithe Charraigeacha Sceirde

LEGEND

- Offshore Array Area

Navigational Features

- Leading Light
- Aid to Navigation
- Port or Harbour
- Pilot Boarding Station
- Anchorage
- Subsea Cable
- Leading Light Arc
- Fish Farm
- Spoil Ground

0 5 10 nm

0 9 18 km

PROJECT TITLE

Sceirde Rocks

MAP TITLE

Navigational Features in Proximity to the Project

VER	REMARKS	DATE	Drawn	Approved
1	FINAL	31/10/2024	DS	AF

DRAWING NO

Figure 14-3

SCALE	PAPER SIZE	DATUM	PROJECTION
1:350,000	A4	WGS 84	UTM 29N

14.5.2.1.1 Key Aids to Navigation

The closest key aid to navigation to the OAA is a flashing beacon at Croaghnakeela Island, approximately 1.7 NM north of the OAA. Consisting of a 4 m tall white concrete tower, this aid to navigation includes several leading lights with 5 NM range, one of which provides assistance to vessels transiting between Mile Rocks and Sceirde Rocks from the southwest. The westernmost WTG position intersects this leading light, while another WTG position is located approximately 20 m from the extremity of the leading light sector.

A lighthouse is located on Rock Island, approximately 1.3 NM east of the OECC, denoting the western extent of the Aran Islands.

14.5.2.1.2 Ports and Harbours

The closest port or harbour to the OAA is Kilronan, a small harbour on Inishmore the largest of the three Aran Islands. Inishmore is located 11.9 NM southeast of the OAA and 7.7 NM east of the OECC. The fishing harbour of Rossaveel is located 12.4 NM east of the OAA, in the northeast of Cashla Bay. This fishing harbour also serves as the mainland terminal for a passenger ferry and cargo service to the Aran Islands. The OECC is situated across the entrances to Galway Bay (the North Sound and South Sound), with Galway located approximately 31 NM east of the OAA.

14.5.2.1.3 Pilot Boarding Stations

Pilot boarding stations for the Aran Islands and Rossaveel are each located 11.8 NM east of the OAA. Pilotage is not compulsory for smaller vessels in either instance (and not compulsory for the Aran Islands harbours at all), but pilots are available from Galway if a vessel requests.

14.5.2.1.4 Subsea Cables

The IRIS subsea cable runs between Iceland and Galway. The OECC south of the Aran Islands intersects this subsea cable.

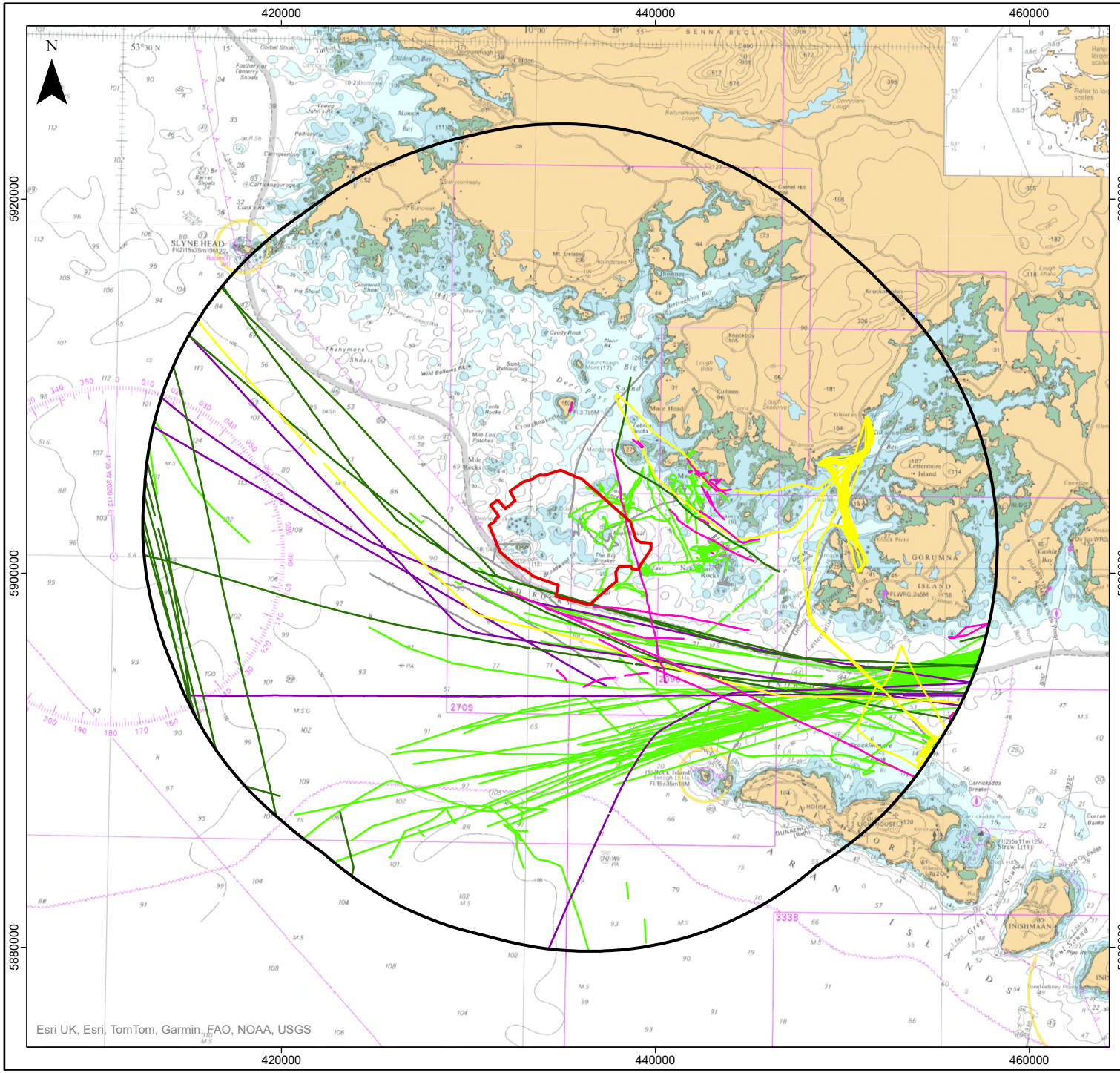
14.5.2.1.5 Anchorages

Charted anchorages are situated throughout the west coast, although none are located within or in proximity to either the OAA or OECC.

14.5.2.2 Vessel Traffic Movements

14.5.2.2.1 OAA

A plot of the vessel traffic recorded via AIS, Radar, and visual observations over the 28 days during the summer and winter survey periods within the OAA study area is colour-coded by vessel type and presented in Figure 14-4.



SCEIRDE ROCKS WINDFARM

Feirm Ghaoithe Charraigeacha Sceirde

LEGEND

- Offshore Array Area
- Offshore Array Area Study Area

Vessel Type

- Unspecified
- Fishing
- Passenger
- Cargo
- Other
- Recreational

0 4 8 nm

0 8 16 km

PROJECT TITLE

Sceirde Rocks

MAP TITLE

28 Days of Vessel Traffic by Vessel Type within the Offshore Array Area Study Area (Summer and Winter 2024)

VER	REMARKS	DATE	Drawn	Approved
1	FINAL	31/10/2024	DS	AF

DRAWING NO

Figure 14-4

SCALE	PAPER SIZE	DATUM	PROJECTION
1:300,000	A4	WGS 84	UTM 29N

For the 14 days analysed in the summer survey period, there was an average of five to six unique vessels[2] per day recorded within the OAA study area, and one unique vessel every two days recorded intersecting the OAA itself. For the 14 days analysed in the winter survey period, there was again an average of five to six unique vessels per day recorded within the OAA study area, and one unique vessel every seven days recorded intersecting the OAA itself. The main vessel types recorded within the OAA study area overall were fishing vessels (53%), 'other' vessels[3] (19%), and recreational vessels (15%).

Vessel length was available via the AIS broadcast for 64% of vessels recorded throughout the two survey periods within the OAA study area and ranged from 8 m for a recreational fishing vessel to 238 m for a cruise liner. Excluding the proportion of vessels for which length was not available, the average length of vessels within the OAA study area throughout both survey periods was 42 m.

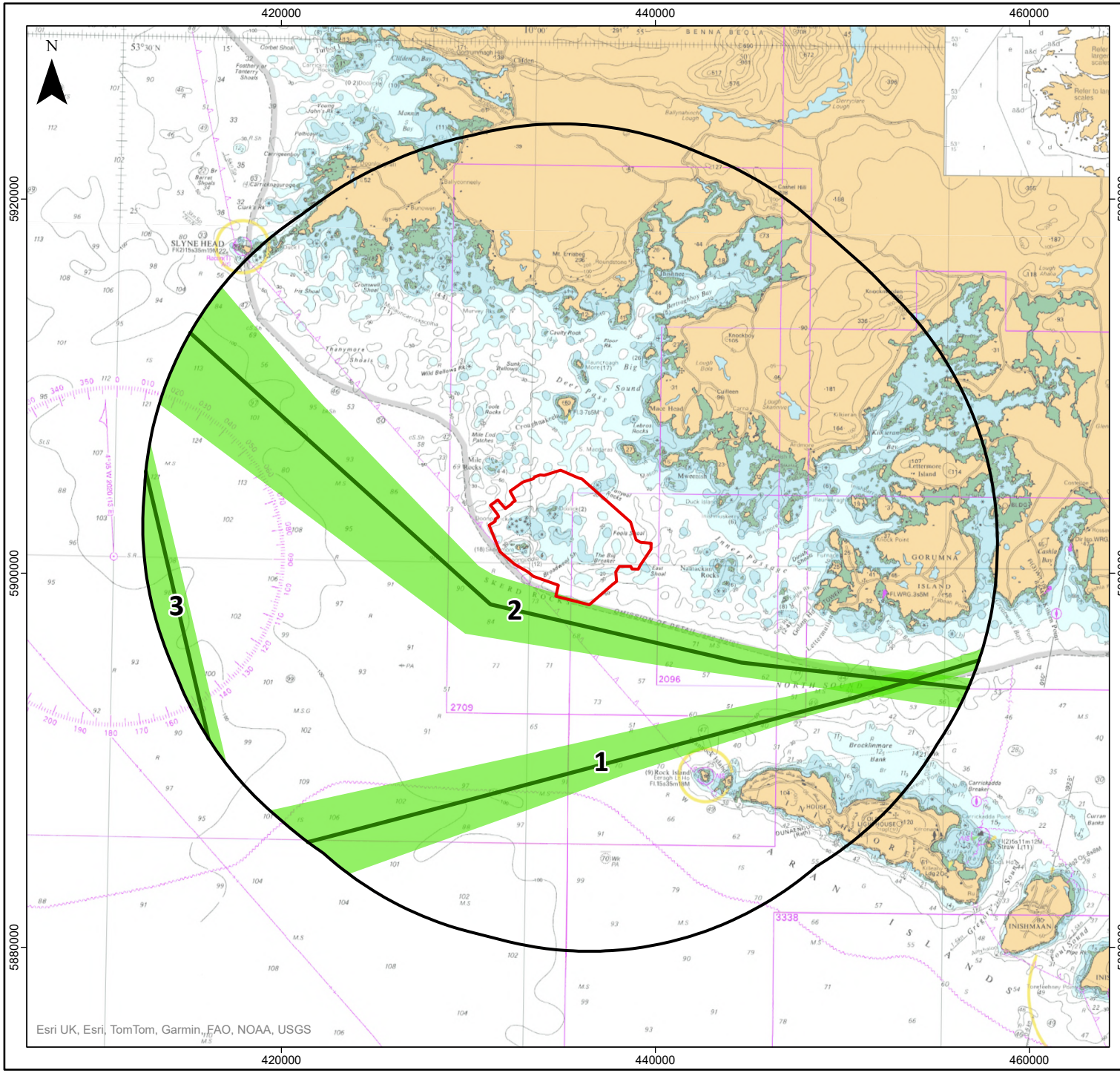
Vessel draught was available via the AIS broadcast for 27% of vessels recorded throughout the two survey periods within the OAA study area, largely due to the proportion of non-AIS and Class B AIS vessels recorded. Vessel draught ranged from 1.3 m for a RNLI lifeboat to 8.6 m for a general cargo vessel. Excluding the proportion of vessels for which draught was not available, the average draught of vessels within the OAA study area throughout both survey periods was 5.1 m.

No vessels were deemed to be at anchor within the OAA study area. Full details of the methodology applied to ascertain this are provided in Section 10.1.4 of Appendix 14-1: NRA.

Main commercial routes have been identified using the principles set out in MGN 654 (MCA, 2021). A total of three main commercial routes were identified within the OAA study area. The main commercial routes and corresponding 90th percentiles are shown in Figure 14-5. Descriptions for each of the main routes are provided in Table 14-11.

[2] For the purposes of vessel traffic analysis, a unique vessel is considered to be an individual vessel identified on any particular calendar day, irrespective of how many tracks were recorded for that vessel on that day. This prevents vessels being over counted.

[3] These consisted primarily of vessels associated with fish farm activities, with one RNLI lifeboat also recorded.



SCEIRDE ROCKS WINDFARM

Feirm Ghaoithe Charraigeacha Sceirde

LEGEND

- Offshore Array Area
- Offshore Array Area Study Area
- Main Route Mean Position
- Main Route 90th Percentile

0 4 8 nm

0 8 16 km

PROJECT TITLE

Sceirde Rocks

MAP TITLE

Pre-Wind Farm Main Routes

VER	REMARKS	DATE	Drawn	Approved
1	FINAL	31/10/2024	DS	AF

DRAWING NO

Figure 14-5

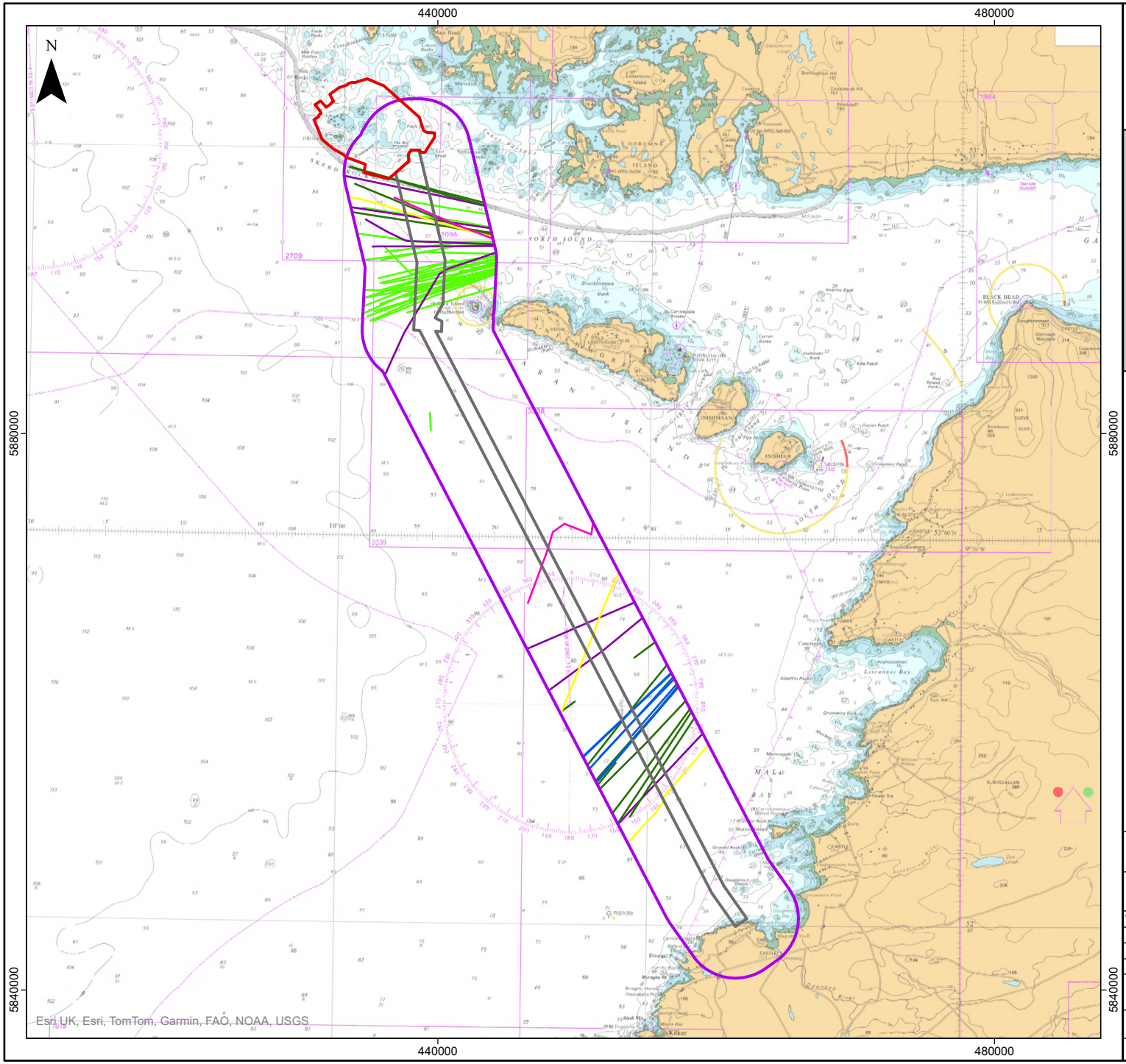
SCALE	PAPER SIZE	DATUM	PROJECTION
1:300,000	A4	WGS 84	UTM 29N

Table 14-11 Main Route Descriptions

Route Number	Vessels Per Week	Description
1	9	**Rossaveel (Ireland) – Fishing grounds**. Used entirely by fishing vessels navigating between Rossaveel and the Porcupine Bank.
2	1-2	**Galway (Ireland) - Rothesay (UK).** Used by cargo vessels (67%) and passenger vessels (33%).
3	1-2	**Limerick (Ireland) – Scandinavian ports.** Used entirely by cargo vessels.

14.5.2.2.2 OECC

A plot of the vessel traffic recorded via AIS over the 28 days during the summer and winter survey periods within the OECC study area is colour-coded by vessel type and presented in Figure 14-6. It is noted that as this dataset covers AIS only there may be additional activity from fishing vessels under 15 m length, although Rossaveel Harbour confirmed during consultation that AIS data for fishing vessels near the Landfall is representative.



SCEIRDE ROCKS WINDFARM

Feirm Ghaoithe Charraigeacha Sceirde

LEGEND

- Offshore Array Area
- Offshore Export Cable Corridor
- Offshore Export Cable Corridor Study Area

Vessel Type

- Fishing
- Passenger
- Cargo
- Tanker
- Other
- Recreational

0 5 10 nm

0 10 20 km

PROJECT TITLE

Sceirde Rocks

MAP TITLE

28 Days of Vessel Traffic by Vessel Type within the Offshore Export Cable Corridor Study Area (Summer and Winter 2022)

VER	REMARKS	DATE	Drawn	Approved
1	FINAL	31/10/2024	DS	AF

DRAWING NO

Figure 14-6

SCALE	PAPER SIZE	DATUM	PROJECTION
1:400,000	A4	WGS 84	UTM 29N

For the 14 days analysed in the summer survey period, there was an average of one to two unique vessels per day recorded within the both the OECC study area and OECC itself. For the 14 days analysed in the winter survey period, there was an average of two to three unique vessels per day recorded within both the OECC study area and OECC itself. The main vessel types recorded within the OECC study area overall were fishing vessels (50%), cargo vessels (20%), and tankers (12%).

Vessel length was available for all vessels recorded throughout the two 14-day survey periods for the OECC study area and ranged from 11 m for a survey vessel to 238 m for a cruise liner. The average length of vessels within the OECC study area throughout both survey periods was 61 m.

Vessel draught was available for 68% of vessels recorded throughout the two 14-day survey periods for the OECC study area and ranged from 2.6 m for a general cargo vessel to 8.4 m for a cruise liner. The average draught of vessels within the OECC study area throughout both survey periods was 5.0 m.

No vessels were identified as being at anchor within the OECC study area within the survey period.

14.5.2.3 Historical Maritime Incidents

A total of 38 incidents were responded to by the RNLI within the OAA study area between 2013 and 2022. This corresponds to an average of approximately four incidents per year. The most frequent station for incident response was the Aran Islands (63%), with Clifden (37%) the only other station used. Incident type was able to be specified for 63% of all incidents. The most common incident types of these recorded were “machinery failure” (42%) and “person in danger” (21%). Vessel type was able to be specified for 79% of all incidents. The most common vessel types recorded were fishing vessels (27%) followed by recreational vessels (23%). No incidents were responded to by the RNLI within the OAA itself.

A total of four incidents were responded to by the RNLI within the OECC study area between 2013 and 2022, with all four also captured within the OAA study area.

There were three documented MCIB incidents within the OAA study area during the period assessed (1994 to 2023). These incidents are as follows:

- Grounding of a cargo vessel in 2007;
- Man overboard from a fishing vessel in 2010; and
- Man overboard from a fishing vessel in 2012.

Although not documented by the MCIB, it is recognised that in 2000 a fishing vessel ran aground on the rocks off the west coast in this area. The incident resulted in the fatalities of 12 of the 13 crew and loss of the vessel (MAIB, 2001).

Information collected from the IRCG regarding historical maritime incidents is not publicly available, and as such has not been presented.

14.5.3 Baseline Summary

The closest key aid to navigation to the OAA is a flashing beacon at Croaghnakeela Island, approximately 1.7 NM north of the OAA. This aid to navigation includes several leading lights with 5 NM range, one of which intersects the OAA. Kilronan is the closest port or harbour to the Project, located 11.9 NM southeast of the OAA. Rossaveel Harbour is located 12.4 NM east of the OAA, with the OECC situated across the entrance to Galway Bay. The IRIS subsea cable intersects the OECC south of the Aran Islands, and there are charted anchorages situated throughout the coast, with none located within either the OAA or OECC.

Incidents reported to the RNLI for the 10-year period between 2013 and 2022 have been analysed, with approximately four unique incidents per year within 10 NM of the OAA, all responded to out of either the Aran Islands or Clifden station. The most common incident types were "machinery failure" (42%) and "person in danger" (21%). The most common vessel types recorded were fishing vessels (27%) and recreational vessels (23%). A total of three incidents in the region with reports released by the MCIB were identified between 1992 and 2023, comprising one grounding and two instances of a man overboard. Although not documented by the MCIB, it is recognised that in 2000 a fishing vessel ran aground on the rocks off the west coast in this area resulting in the fatalities of 12 of the 13 crew and loss of the vessel (MAIB, 2001).

A total of 28 days of vessel traffic survey data was assessed as part of the NRA process. This comprised of two distinct 14-day periods in August/September and November 2022 to account for seasonal variation, in line with the requirements of MGN 654 (MCA, 2021). An average of five to six unique vessels per day were recorded within 10 NM of the OAA during both the summer and winter survey periods. Fishing vessels (53%), 'other' vessels (19%), and recreational vessels (15%) were the most prominent vessel types, noting that recreational vessels and passenger vessels were only present in the summer survey period. Three main commercial routes were identified from the vessel traffic survey data, comprising a fishing vessel route in/out of Rossaveel, a cargo vessel and passenger vessel route in/out of Galway, and a cargo vessel route to/from Limerick. There were no vessels identified within either dataset that were likely to be at anchor.

14.6 Likely Significant Effects and Associated Mitigation Measures

14.6.1 Do Nothing Scenario

In the event that the Project does not proceed, an assessment of future conditions for Shipping and Navigation has been carried out and is described within Section 14.6.1.1 to Section 14.6.1.2.

14.6.1.1 Increases in Commercial Vessel Activity

There is uncertainty associated with long-term predictions of vessel traffic growth including the potential for any other new developments in Irish or transboundary ports. However, during the Hazard Workshop, the Port of Galway noted plans for the expansion of the Port of Galway (the 'New Port of Galway'). The planning application for this development was submitted in 2014 and has not yet been determined. If taken forward, the New Port of Galway would provide 660 m of quay berth to 12 m depth below Chart Datum (CD), serviced by an 8 m deep channel. Berthing facilities would accommodate general cargo vessels, oil tankers, passenger vessels, and container vessels (Port of Galway, 2024a).

Currently the total berth length for the Port of Galway (excluding marinas and space for local vessels) is 1,016 m (Port of Galway, 2024b). Therefore, the increase in quay berth would add considerable potential for increased vessel volumes.

Accounting for all commercial vessel types throughout the study area including those resulting from the development of the New Port of Galway (noting that not all commercial vessel movements are associated with the Port of Galway), two independent scenarios of potential growth in commercial vessel movements of 10% and 20% have been estimated throughout the lifetime of the Project. Although increases associated with the New Port of Galway may be greater, it is noted that - at the time of writing – this port expansion has not yet been approved. Additionally, if taken forward, it is feasible that the expansion may not be realised in its entirety and not all vessel traffic associated with the expansion may navigate in proximity to the OAA. The use of 10% and 20% increases (applied across all commercial vessel types) is considered conservative on this basis.

14.6.1.2 Increases in Commercial Fishing Vessel and Recreational Vessel Activity

There is similar uncertainty associated with long-term predictions for commercial fishing vessel and recreational vessel transits given the limited reliable information on future trends upon which any firm assumption could be made.

For fishing vessels, the New Port of Galway for which a planning application was made (approximately 10 years ago) does include additional berth space for fishing vessels (Port of Galway, 2024a). For recreational vessels, the development of a new marina features in the New Port of Galway planning application, although as part of the latter stages of the potential development. Additional small craft activity associated with the New Port of Galway is not likely to be wholly relevant to the OAA, noting that the majority of fishing vessel traffic currently passing in proximity to the OAA is out of Rossaveel Harbour. Additionally, during consultation potential new leisure craft facilities at Kilronan on the Aran Islands were raised although there is limited information available on this development, and again some related activities may be limited to within Galway Bay rather than interacting with the OAA.

Therefore, a conservative potential growth in commercial fishing vessel and recreational vessel movements of 10% and 20% has been estimated throughout the lifetime of the Project and applied for the purposes of the assessment. Changes in fishing activity are considered further in relation to active fishing in Chapter 13: Commercial Fisheries.

This subsection outlines the likely significant effects for the do-nothing scenario with consideration of the predicted future baseline described in the previous subsections.

With this predicted future baseline accounted for it can be expected that third-party collision risk may marginally increase due to the increase in volumes of vessel traffic in the region. However, in the absence of the Project, the sea room availability would not be reduced and so changes in collision risk will be limited. Additionally, without the presence of the Project vessels, the impact associated with third-party to Project vessels collision risk would not exist.

Likewise, without the presence of surface infrastructure, subsea cable, and cable protection the impacts associated with allision risk, anchor interaction, and under-keel clearance, respectively, would not exist.

Similarly to third-party collision risk, the predicted future baseline may marginally increase effects on emergency response capabilities, but in the absence of the Project these changes would likely be limited.

14.6.2 Project Scenario

With the Project in situ, an assessment of Shipping and Navigation has been carried out and is described within Section 14.6.2.1 to Section 14.6.2.7.

14.6.2.1 Displacement of Third-Party Vessels and Resulting Increased Collision Risk

Activities associated with the construction, operation and maintenance, and decommissioning of structures and cables may displace existing routes/activity and increase encounters and collision risk with other third-party vessels.

14.6.2.1.1 *Vessel Displacement*

The volume of vessel traffic passing within, or in proximity to, the OAA has been established using vessel traffic data collected during dedicated surveys (28 days over summer and winter 2022) as well as

Anatec's ShipRoutes database. These datasets were interrogated to identify main routes using the principles set out in MGN 654 (MCA, 2021) (see Section 14.5.2.2).

Although there will be no restrictions on entry into the buoyed construction area, based on experience at previously under construction offshore wind farms it is anticipated that the majority of commercial vessels will choose not to navigate internally within the buoyed construction area and therefore a main route deviation will be required.

The full methodology for main route deviations is provided in Section 14.4.1 of Appendix 14-1: NRA, with minor deviations established in line with MGN 654 (MCA, 2021). In particular, it is assumed that a minimum distance of 1 NM between the OAA and the mean position of main routes will be maintained. On this basis, a deviation will be required for one of the three main routes identified within the OAA study area. This is a cargo vessel and passenger vessel route between Galway and Rothesay with a 0.1 NM increase in distance required to pass further south and increase the passing distance from the OAA. This corresponds to a 0.04% increase in the total route length.

Based on experience at previously under construction offshore wind farms, it is anticipated that fishing vessels and recreational vessels will choose not to routinely navigate internally within the buoyed construction area, noting there would be no restriction on transit. There is considered to be sufficient sea room outside of the OAA for transits from such vessels to be accommodated, although particular consideration is needed of navigation between Mile Rocks and Sceirde Rocks.

As per Section 14.5.2.1.1, a flashing beacon providing leading lights in the area is located on Croaghnakeela Island, 1.7 NM north of the OAA. These leading lights assist vessels transiting between Mile Rocks and Skerd Rocks. The westernmost WTG position intersects this leading light, while another WTG position is located approximately 20 m from the extremity of the leading light sector. Therefore, the OAA may impede upon the ability to detect these for vessels. The vessel traffic survey data did not indicate use of this leading light, and no concerns were raised during consultation when raised, however it is possible that Irish Lights may require additional aids to navigation for WTGs at this extent of the OAA to minimise disruption.

It is noted that displacement of active commercial fishing is assessed separately in Chapter 13: Commercial Fisheries.

Given the available sea room, despite the OECC spanning the opening to Galway Bay, it is considered unlikely that cable installation will lead to any material displacement or disruption, noting any impact would be localised to the spatial area immediately around the vessel and would be temporary in nature. It is also advantageous that the OECC runs perpendicular to the general flow of vessel traffic, minimising the temporal extent of any exposure to displacement.

The main consequence of vessel displacement will be increased journey times and distances for affected third-party vessels. Vessels are expected to comply with international and flag state regulations including COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974) and will be able to passage plan in advance given the promulgation of information relating to the Offshore Site and relevant nautical charts as any works progress.

14.6.2.1.2 *Increased Third-Party to Third-Party Collision Risk*

It is anticipated that one of the three main routes identified in Section 14.5.2.2.1 will deviate as a result of the construction of the OAA. This could lead to increased vessel densities within the area, which could in turn lead to an increase in vessel-to-vessel encounters and therefore increased collision risk.

Base and future case scenarios were assessed to investigate changes in collision risk post-commissioning of the Project. Based on the base case post wind farm scenario, the collision frequency was estimated at one in 46,322 years, which represents a 0.03% increase compared to the base case pre wind farm scenario. When considering a future case traffic increase of 20%, the change in collision frequency

increases by 44% compared to the base case pre wind farm scenario – to one in 32,140 years. These changes are associated with the vessels displaced south of the OAA and align with the findings of the incident data assessment (see Section 14.5.2.3), which showed no recorded collisions in the OAA study area over the periods studied. Details pertaining to the modelling of collision risk are provided in Section 15 of Appendix 14-1: NRA.

The promulgation of information relating to construction activities, deployment of the buoyed construction area, and charting of infrastructure will allow vessel Masters to passage plan in advance, minimising any displacement and hence collision risk. Appropriate lighting and marking during construction including the buoyed construction area will be agreed with Irish Lights. These navigational aids will further maximise mariner awareness when in proximity.

During the operation and maintenance phase, the minimum spacing between WTGs (1,017 m) is sufficient to ensure the view of other vessels will not be blocked or hindered, again reducing the likelihood of an encounter occurring in proximity to the OAA.

In the event that an encounter does occur, it is likely to be localised and occur for only a short duration, with collision avoidance action implemented by the vessels involved, in line with the COLREGs, thus ensuring that the situation does not develop into a collision incident. This is supported by experience at previous under construction offshore wind farms, where no collision incidents involving two third-party vessels have been reported.

Historical collision incident data (see Section 9.7 of Appendix 14-1: NRA) also indicates that the most likely consequences will be slight should a collision occur, with minor contact between the vessels resulting in minor damage and no injuries to persons, with both vessels able to resume their respective passages and undertake a full inspection at the next port. As an unlikely worst case, one or more of the vessels could be foundered resulting in a Potential Loss of Life (PLL) and pollution.

14.6.2.1.3 Mitigation by Design

Embedded mitigation measures identified as relevant to reducing the significance of effect are as follows:

- Advisory safe passing distances;
- Guard vessel(s);
- Lighting and marking;
- Marking on nautical charts; and
- Promulgation of information.

14.6.2.1.4 Potential Significance of Effect

The frequency of occurrence and severity of consequence for each phase of the Offshore Site is presented in Table 14-12 alongside the resulting significance of the effect.

Table 14-12 Significance of Effect for Displacement of Third-Party Vessels and Resulting Increased Collision Risk

Element of Hazard	Phase	Frequency of Occurrence	Severity of Consequence	Significance of Effect
Vessel displacement	Construction	Frequent	Negligible	Tolerable with Mitigation (ALARP)
	Operation and maintenance	Frequent	Negligible	Tolerable with Mitigation (ALARP)

	Decommissioning	Frequent	Negligible	Tolerable with Mitigation (ALARP)
Third-party vessel to vessel collision risk	Construction	Extremely unlikely	Moderate	Broadly Acceptable (ALARP)
	Operation and maintenance	Extremely unlikely	Moderate	Broadly Acceptable (ALARP)
	Decommissioning	Extremely unlikely	Moderate	Broadly Acceptable (ALARP)

In summary, the significance of the impact is Tolerable with Mitigation (ALARP) as a worst case across elements of the impact for all phases, which is Not Significant.

14.6.2.2 Collision Risk Between Third-Party Vessels and Project Vessels

Vessels associated with construction, operation and maintenance, and decommissioning activities may increase encounters and collision risk for other vessels already operating in the area.

14.6.2.2.1 *Qualification of Risk*

Up to 21 different vessel activities are required throughout the construction and decommissioning phases, noting this will include Restricted in Ability to Manoeuvre (RAM) vessels. It is assumed that Project vessels will be on-site throughout the duration of the construction and decommissioning phases.

Up to 1,098 return trips per year by operational vessels may be made throughout the operation and maintenance phase, including RAM vessels. It is assumed that Project vessels will be on-site throughout the operation and maintenance phase, with likely seasonal differences present – it is estimated that there will be more vessel movements in summer months. It is noted that the movement of Project vessels during the operation and maintenance phase represents a decrease in movements in comparison to the construction and decommissioning phases.

Encounter and collision risk involving Project vessels in all phases will be managed by marine coordination including the application of traffic management procedures such as the designation of entry and exit points to and from the OAA and routes to and from base ports. Additionally, Project vessels will carry AIS and be compliant with Flag State regulations including IMO conventions such as the COLREGs. These mitigations will particularly benefit any third-party vessels choosing to navigate internally within the OAA during the operation and maintenance phase (expected to be limited to fishing and recreational vessels – see Section 14.6.2.4.3) by minimising the likelihood of an interaction.

Advisory safe passing distances will be deployed around Project vessels where works are ongoing during all phases as defined by risk assessment. Advanced warning and accurate locations of advisory safe passing distances will be promulgated by Notices to Mariners.

Appropriate marine lighting and marking during construction including the buoyed construction area will be agreed with Irish Lights (provisional scheme provided in Appendix 5-9: LMP). These navigational aids will further maximise mariner awareness when in proximity to ongoing construction works in the OAA. The structures within the OAA will exhibit lights, marks, sounds, signals and other

aids to navigation as required by Irish Lights, maximising mariner awareness to the potential for Project vessel presence when in proximity, both in day and night conditions including in poor visibility.

Third-party vessels may experience restrictions on visually identifying Project vessels entering and exiting the OAA during reduced visibility; however, this impact will be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions and Project vessels mandatorily will carry AIS regardless of size. It is noted that the likelihood of a collision is likely to be greater in reduced visibility when the identification of Project vessels entering and exiting the OAA may be encumbered. However, again the COLREGs regulate vessel movements in adverse weather conditions and require all vessels operating in reduced visibility to reduce speed to allow more time for reacting to encounters, thus minimising the collision risk.

Based on historical incident data, there has been one instance of a third-party vessel colliding with a Project vessel for an offshore wind farm in the UK (see Appendix 14-1: NRA). In this incident, occurring in 2011, moderate vessel damage was reported with no harm to persons. Since then, awareness of offshore wind developments and application of the measures outlined above has improved and been refined considerably in the interim, with no further collision incidents reported since.

If an encounter occurs between a third-party vessel and a Project vessel, the encounter is likely to be localised and occur for only a short duration. With collision avoidance action implemented in line with the COLREGs, the vessels involved will likely be able to resume their respective passages and/or activities with no long-term consequences.

Should a collision occur, the most likely consequences will be similar to that outlined for the case of a collision between two third-party vessels (see Section 14.6.2.1), namely minor contact between the vessels resulting in minor damage and no injuries to persons with both vessels able safely to make their next port to undertake a full inspection. This is particularly the case where a third-party vessel is navigating internally within the OAA as such transits are more likely to be at lower speeds given the existing bathymetry conditions and presence of surface infrastructure.

As an unlikely worst case, one or more of the vessels involved in a collision could be foundered resulting in a PLL and pollution. If pollution were to occur in proximity to the Offshore Site or involving a Project vessel, then the Project's pollution planning (Marine Pollution Contingency Plan (MPCP)) will be implemented to minimise the environmental effects, with this developed in accordance with MARPOL.

14.6.2.2.2 Mitigation by Design

Embedded mitigation measures identified as relevant to reducing the significance of effect are as follows:

- Advisory safe passing distances;
- Buoyed construction area;
- Guard vessel(s);
- Lighting and marking;
- Marine coordination for Project vessels;
- Marking on nautical charts;
- Pollution planning;
- Project vessel compliance with international marine regulations; and
- Promulgation of information

14.6.2.2.3 Potential Significance of Effect

The frequency of occurrence and severity of consequence for each phase of the Offshore Site is presented in Table 14-13 alongside the resulting significance of effect.

Table 14-13 Significance of Effect for Collision Risk Between Third-Party Vessels and Project Vessels

Phase	Frequency of Occurrence	Severity of Consequence	Significance of Effect
Construction	Extremely unlikely	Moderate	Broadly Acceptable (ALARP)
Operational	Extremely unlikely	Moderate	Broadly Acceptable (ALARP)
Decommissioning	Extremely unlikely	Moderate	Broadly Acceptable (ALARP)

In summary, the significance of the impact is Broadly Acceptable (ALARP) for all phases, which is Not Significant.

14.6.2.3 Reduced Access to Local Ports

Construction, operation and maintenance, and decommissioning activities as well as the presence of surface structures within the OAA may result in reduced access to local ports and harbours for vessels owing to both to the physical presence of the OAA and Project vessels also accessing local ports and harbours.

14.6.2.3.1 Qualification of Risk

The closest port or harbour to the OAA is Kilronan Harbour, located approximately 11.9 NM to the southeast. Rossaveel Harbour is 12.4 NM to the east, and Galway Harbour is located approximately 31 NM to the east. Given the relative distance to ports in the area and the anticipated deviations for the main commercial routes, it is not anticipated that there will be any substantial effect on vessel approaches to and from the local ports due to the OAA beyond the deviations already outlined for impacts on vessel displacement (see Section 14.6.2.1).

The same parameters for vessel activities outlined in Appendix 14-1: NRA are again assumed. Project vessel movements also have the potential to affect port access, particularly at base ports for activities. The construction and decommissioning port(s) have not yet been determined and therefore limited assessment may be undertaken.

For operation and maintenance, it is assumed that Rossaveel Harbour will be the primary base. The use of facilities and frequent transits by Project vessels may disrupt third-party access to the harbour, particularly when considering the narrow approach to the harbour through Cashla Bay. However, Project vessels will be managed by marine coordination such as designated routes to and from Rossaveel harbour. During consultation, Rossaveel Harbour indicated no navigational safety concerns with use of the harbour, with the proposed mitigation measures suitable to allow continued safe navigation.

Pilotage activities are also not expected to be affected based on feedback from Rossaveel Harbour and the Port of Galway, even with the future movement further west of the Galway pilot boarding station following the planned port expansion.

The most likely consequences of the impact are increased journey times and distances due to the presence of the buoyed construction area and Project vessels, as per the vessel displacement impact.

14.6.2.3.2 Mitigation by Design

Embedded mitigation measures identified as relevant to reducing the significance of effect are as follows:

- Lighting and marking;
- Marine coordination for Project vessels;
- Marking on nautical charts;
- Project vessel compliance with international marine regulations; and
- Promulgation of information.

14.6.2.3.3 Potential Significance of Effect

The frequency of occurrence and severity of consequence for each phase of the Offshore Site is presented in Table 14-14 alongside the resulting significance of effect.

Table 14-14 Significance of Effect for Reduced Access to Local Ports

Phase	Frequency of Occurrence	Severity of Consequence	Significance of Effect
Construction	Remote	Negligible	Broadly Acceptable (ALARP)
Operation and maintenance	Remote	Negligible	Broadly Acceptable (ALARP)
Decommissioning	Remote	Negligible	Broadly Acceptable (ALARP)

In summary, the significance of the impact is Broadly Acceptable (ALARP) for all phases, which is Not Significant.

14.6.2.4 Creation of Third-Party Allision Risk

Presence of structures within the OAA will lead to creation of powered, drifting and internal allision risk for vessels.

The spatial extent of the impact is small given that a vessel must be in close proximity to an offshore wind farm structure for an allision incident to occur. Each allision element is considered in turn in terms of frequency of occurrence and severity of consequence, with the resulting significance of the residual risk across the various elements summarised at the end of the assessment. The forms of allision considered include:

- Powered allision risk;
- Drifting allision risk; and
- Internal allision risk.

14.6.2.4.1 Powered Allision Risk

Based on the quantitative assessment undertaken (see Appendix 14-1: NRA), the base case annual powered vessel to structure allision frequency was estimated to be one in 228,910 years. When

considering a future case traffic increase of 20%, the powered allision frequency was estimated to be one in 191,989 years. This is a very low return period compared to that estimated for other offshore wind farm developments and is reflective of the relatively low volume of vessel traffic intersecting or passing in close proximity to the OAA. Details pertaining to the modelling of powered allision risk are provided in Section 15 of Appendix 14-1: NRA. Based on historical incident data, there have been two reported instances of a third-party vessel alliding with an operational offshore wind farm structure in the UK. Both of these incidents involved a fishing vessel, with an RNLI lifeboat attending on both occasions and a helicopter deployed in one case.

Vessels are expected to comply with national and international flag state regulations (including the COLREGs and SOLAS) and will be able to passage plan a route which minimises the effect given the promulgation of information relating to the Offshore Site, including the charting of infrastructure on relevant nautical charts. On approach, the operational marine lighting and marking on the structures (which will be agreed with Irish Lights) will also assist in maximising awareness. The lighting and marking may also assist any vessel navigating between Mile Rocks and Skerd Rocks where use of the existing leading lights may be partially impeded due to the presence of WTGs.

Should an allision occur, the consequences will depend on multiple factors including the energy of the impact, structural integrity of the vessel and sea state at the time of the impact. Fishing vessels and recreational vessels are considered most vulnerable to the impact given the potential for a non-steel construction and possible internal navigation within the OAA by such vessels. In such cases, the most likely consequences will be minor damage with the vessel able to resume passage and undertake a full inspection at the next port. As an unlikely worst case, the vessel could be foundered resulting in a PLL and pollution. If pollution were to occur, then the Project's pollution planning (MPCP) will be implemented to minimise the environmental effects.

14.6.2.4.2 Drifting Allision Risk

Based on the quantitative assessment undertaken (see Appendix 14-1: NRA), the base case annual drifting vessel to structure allision frequency was estimated to be one in 168,577 years. When considering a future case traffic increase of 20%, the drifting allision frequency was estimated to be one in 141,344 years. This is again a very low return period compared to that estimated for other offshore wind farm developments and is reflective of the relatively low volume of vessel traffic passing in proximity to or within the OAA. Details pertaining to the modelling of drifting allision risk are provided in Section 15 of Appendix 14-1: NRA.

Based on historical incident data, there have been no instances of a third-party vessel alliding with an operational offshore wind farm structure whilst adrift. However, there is considered to be potential for a vessel to be adrift in the area; this is reflected in the incident data reviewed in proximity to the Offshore Site which indicates that machinery failure[4] is the most common incident type (approximately 42%). A vessel adrift may only develop into an allision situation if in proximity to an offshore wind farm structure. This is only the case where the adrift vessel is located internally within or in close proximity to the OAA and the direction of the wind and/or tide directs the vessel towards a structure.

In circumstances where a vessel drifts towards a structure in the OAA, there are actions which the vessel may take to prevent the drift incident developing into an allision situation. Powered vessels may be able to regain power prior to reaching the OAA (i.e., by rectifying any fault). Failing this, the vessel's emergency response procedures would be implemented which may include an emergency anchoring event following a check of the relevant nautical charts to ensure the deployment of the anchor will not lead to other impacts (such as anchor snagging on a subsea cable), or the use of thrusters (depending on availability and power supply). Given the water depths in the area, it is expected that emergency anchoring would not be restricted to larger vessels, i.e., it would also be an option for small craft.

[4] *Noting that machinery failure may not lead to a situation as severe as the vessel being adrift.*

Where the deployment of the anchor is not possible (e.g., for small craft), any Project vessels on the Offshore Site may be able to render assistance in liaison with the IRCG and in line with SOLAS obligations (IMO, 1974). This response will be managed via the IRCG and marine coordination and depends on the type and capability of vessels on site. This would be particularly relevant for sailing vessels relying on metocean conditions for propulsion, noting if the vessel becomes adrift in proximity to a structure there may be limited time to render assistance.

Should an allision occur, the consequences will be similar to those noted for the case of a powered allision including the unlikely worst-case of foundering and pollution; in the highly unlikely scenario of a drifting allision incident resulting in pollution, the implementation of the Project's pollution planning (MPCP) will minimise the environmental effect. Additionally, a drifting vessel is likely to transit at a reduced speed compared to a powered vessel, thus reducing the energy of the impact, including in the case of a recreational vessel under sail.

14.6.2.4.3 Internal Allision Risk

As noted previously, based on experience at existing operational offshore wind farms, and due to the nature of the existing bathymetry conditions, it is anticipated that commercial vessels will be unlikely to navigate internally within the OAA. Fishing and recreational vessels may be more likely to transit through noting they may be less likely to do so while the buoyed construction area is in place.

The base case annual fishing vessel to structure allision frequency (see Appendix 14-1: NRA) is estimated to be one in 68 years. When considering a future case traffic increase of 20%, the fishing allision frequency was estimated to be one in 57 years. This return period is reflective of the volume of fishing vessel traffic in the area, both in transit and engaged in fishing activities, and the conservative assumptions made within the modelling process; in particular that baseline activity in terms of proximity to WTGs will not change. This is a very conservative assumption, and in reality, fishing vessels will account for the presence of the WTGs. Furthermore, the worst consequences reported for vessels involved in an allision incident involving a UK offshore wind farm development has been flooding, with no life-threatening injuries to persons reported (the model is calibrated against known reported incidents). Further details pertaining to the modelling of fishing allision risk are provided in Section 15 of Appendix 14-1: NRA.

The minimum spacing between structures of 610 m (WTG to OSS) is considered sufficient for safe internal navigation i.e., for vessels to keep clear of the offshore wind farm structures within the OAA. During consultation, Rossaveel Harbour indicated that internal navigation by fishing vessels can be managed through marine coordination.

As with any passage, any vessel navigating within the OAA is expected to passage plan in accordance with SOLAS Chapter V (IMO, 1974) and effective promulgation of information will ensure that such vessels have good awareness. Given the existing bathymetry conditions, it is also expected that mariners navigating within the OAA will already have a heightened alertness. Operational marine lighting and marking will be in place as required by and agreed with the Irish Lights. This will include unique identification marking of each offshore wind farm structure in an easily understandable pattern to minimise the likelihood of a mariner navigating internally within the OAA becoming disoriented.

Should a recreational vessel under sail enter the proximity of a WTG, there is also potential for effects such as wind shear, masking and turbulence to occur. From previous studies of offshore wind developments, it has been concluded that WTGs do reduce wind velocity downwind of a WTG (MCA, 2008) but that no negative effects on recreational craft have been reported on the basis of the limited spatial extent of the effect and its similarity to that experienced when passing a large vessel or close to other large structures (such as bridges) or the coastline. In addition, no practical issues have been raised by recreational receptors to date when operating in proximity to existing offshore wind developments. As an unlikely worst case, such effects could contribute to an allision incident with similar consequences to those outlined for powered and drifting allisions.

For recreational vessels with a mast there is an additional allision risk when navigating internally within the OAA associated with the WTG blades. However, the minimum blade tip clearance (27.5 m above HAT) exceeds the minimum clearance the RYA recommend (22 m) for minimising allision risk (RYA, 2019) which is also noted in MGN 654.

14.6.2.4.4 Mitigation by Design

Embedded mitigation measures identified as relevant to reducing the significance of effect are as follows:

- Advisory safe passing distances;
- Buoyed construction area;
- Compliance with MGN 654;
- Lighting and marking;
- Marine coordination for Project vessels;
- Marking on nautical charts;
- Minimum blade clearance;
- Pollution planning; and
- Promulgation of information.

14.6.2.4.5 Potential Significance of Effect

The frequency of occurrence and severity of consequence for each phase of the Offshore Site is presented in Table 14-15 alongside the resulting significance of effect.

Table 14-15 Significance of Effect for Creation of Third-Party Allision Risk

Element of Impact	Phase	Frequency of Occurrence	Severity of Consequence	Significance of Effect
Powered allision risk	Operation and maintenance	Extremely unlikely	Moderate	Broadly Acceptable (ALARP)
Drifting allision risk		Negligible	Moderate	Broadly Acceptable (ALARP)
Internal allision risk		Remote	Moderate	Tolerable with Mitigation (ALARP)

In summary, the significance of the impact is Tolerable with Mitigation (ALARP) as a worst case across elements of the impact, which is Not Significant.

14.6.2.5 Reduction in Under-Keel Clearance due to Cable Protection

The presence of protection over subsea cables may reduce charted water depths leading to increased risk of under keel interaction for passing vessels.

14.6.2.5.1 Qualification of Risk

For all subsea cables relating to the Offshore Site, the minimum burial depth is 1m, noting actual burial depths will be determined via the cable burial risk assessment process.

Where cable burial is not possible, alternative cable protection methods will be deployed which will again be determined within the cable burial risk assessment. The requirements of MGN 654 in relation to cable protection will apply, namely cable protection will not change the charted water depth by more than 5% unless appropriate mitigation is agreed with the MSO and Irish Lights.

For the OECC, charted water depths in offshore areas are reasonably deep and therefore such a circumstance is considered unlikely. For nearshore areas with a cable protection height of 3.4 m discussions with the MSO and Irish Lights may be necessary. However, it is acknowledged that from the baseline data vessel traffic does not navigate in close proximity to the Landfall and therefore there is a limited pathway through which an under-keel interaction may occur. For the OAA, transits by deeper draught vessels are not anticipated since larger vessels are expected to deviate around the OAA, limiting the risk.

Should an underwater allision occur, minor damage incurred is the most likely consequence, and foundering of the vessel resulting in a PLL and pollution the unlikely worst-case consequence, with the environmental effects of the latter minimised by the implementation of the Project's pollution planning (MPCP).

Given that rockberms associated with subsea cable protection are not planned to be removed during decommissioning or post-decommissioning, this hazard will remain present at these times.

14.6.2.5.2 Mitigation by Design

Embedded mitigation measures identified as relevant to reducing the significance of effect are as follows:

- Cable protection;
- Compliance with MGN 654 and its annexes;
- Decommissioning Plan;
- Marking on charts;
- Pollution planning; and
- Promulgation of information.

14.6.2.5.3 Potential Significance of Effect

The frequency of occurrence and severity of consequence for each phase of the Offshore Site is presented in Table 14-16 alongside the resulting significance of effect.

Table 14-16 Significance of Effect for Reduction in Under-Keel Clearance due to Cable Protection

Phase	Frequency of Occurrence	Severity of Consequence	Significance of Effect
Operation and maintenance	Extremely unlikely	Moderate	Broadly Acceptable (ALARP)
Decommissioning	Extremely Unlikely	Moderate	Broadly Acceptable (ALARP)

In summary, the significance of the impact is Broadly Acceptable (ALARP), which is Not Significant.

14.6.2.6 Anchor Interaction with Subsea Infrastructure

Presence of export and IAC may increase the potential for interaction with sub-sea cables.

14.6.2.6.1 *Qualification of Risk*

The spatial extent of the impact is limited given that a vessel must be in close proximity to an export cable or IAC for an interaction to occur.

There are three anchoring scenarios which are considered for this impact:

- Planned anchoring – most likely as a vessel awaits a berth to enter port but may also result from adverse weather conditions, machinery failure or sub-sea operations;
- Unplanned anchoring – generally resulting from an emergency situation where the vessel has experienced steering failure; and
- Anchor dragging – caused by anchor failure.

Although the second of these scenarios may involve limited decision-making time if drifting towards an impact, in all three scenarios it is anticipated that the charting of infrastructure including the sub-sea cables will inform the decision to anchor, as per Regulation 34 of SOLAS (IMO, 1974).

No anchored vessels were identified within the vessel traffic survey data assessed, and no anchorages (preferred or charted) were identified in immediate proximity to the Offshore Site. The closest anchorages to the Offshore Site were located in sheltered areas closer to shore. Risk of interaction on a planned anchoring or dragged anchoring basis is therefore anticipated to be low within the OAA. In terms of emergency anchoring, any areas of high traffic volume are likely to represent the areas of highest risk, particularly where there are impacts nearby (e.g., structures, rocks, shallows).

The likelihood of anchor interaction with a subsea cable is further minimised by the burial of the cables and use of external cable protection where required, which will be informed by the cable burial risk assessment process, which will account for traffic volumes and sizes.

Given that rockberms associated with subsea cable protection are not planned to be removed during decommissioning or post-decommissioning, this hazard will remain present at these times.

Should an anchor interaction incident occur, the most likely consequences will be low based on historical anchor interaction incidents, with no material damage incurred to the cable or the vessel. As an unlikely worst case, a snagging incident could occur and/or the vessel's anchor and the cable could be damaged, and lead to risk of loss of stability of a small vessel. However, with the mitigation measures discussed in the above paragraph in place, this effect will be minimised.

14.6.2.6.2 *Mitigation by Design*

Embedded mitigation measures identified as relevant to reducing the significance of effect are as follows:

- Cable protection;
- Compliance with MGN 654 and its annexes;
- Decommissioning Plan
- Marking on nautical charts; and
- Promulgation of information.

14.6.2.6.3 Potential Significance of Effect

The frequency of occurrence and severity of consequence for each phase of the Offshore Site is presented in Table 14-17 alongside the resulting significance of effect.

Table 14-17 Significance of Effect for Anchor Interaction with Subsea Infrastructure

Phase	Frequency of Occurrence	Severity of Consequence	Significance of Effect
Operation and maintenance	Negligible	Minor	Broadly Acceptable (ALARP)
Decommissioning	Negligible	Minor	Broadly Acceptable (ALARP)

In summary, the significance of the impact is Broadly Acceptable (ALARP), which is Not Significant.

14.6.2.7 Reduction in Emergency Response Capability

Presence of structures, increased vessel activity and personnel numbers may reduce emergency response capability by increasing the number of incidents, increase consequences or reducing access for the responders.

14.6.2.7.1 Emergency Response Resources

The parameters for vessel activities outlined in Section 14.4.6 are again assumed. It is recognised that in instances of severe weather conditions Project vessel activities are likely to be withdrawn. Nevertheless, the presence of such vessels will increase the likelihood of an incident and subsequently increase the likelihood of multiple incidents occurring simultaneously, diminishing emergency response capability. As an unlikely worst case, the consequences of such a situation could include a failure of emergency response to an incident, resulting in a PLL and pollution.

Given the distances that may be covered by air-based SAR support (the SAR helicopter base at Shannon is located approximately 49 NM from the OAA), the spatial extent of this impact is considered reasonably large. The OAA covers approximately 11 square nautical miles (NM^2) which represents a small area to search compared to other existing offshore wind farms. In addition, it is unlikely that a SAR operation will require the entire OAA to be searched; it is much more likely that a search could be restricted to a smaller area within which a casualty is known to be located (noting account of assumptions on any potential drift of the casualty).

Where a SAR helicopter is required, the range and endurance time of the assets which will be available at Shannon is such that there will be no issue with reaching the OAA. However, the base at Shannon responds to a wide region and in the event of simultaneous incidents that require a SAR response the response time could be substantially affected.

However, with Project vessels to be managed through marine coordination and compliance with Flag State regulations, the likelihood of an incident is minimised, and should an incident occur Project vessels would likely be well equipped to assist, either through self-help capability or through SOLAS obligations (IMO, 1974). The Project's pollution planning (MPCP) will also be implemented to minimise the environmental effects of any incident involving pollution.

Indeed, there is potential that the presence of Project vessels will have a positive effect on emergency response, possibly serving as first responder under SOLAS obligations should an incident occur (whether related to the OAA or otherwise). This is demonstrated by various reported historical

instances of wind farm related vessels responding to unrelated incidents (see Section 9 of Appendix 14-1: NRA for full details).

It is also acknowledged that the presence of the OAA within an area containing existing navigational hazards and the associated aids to navigation may assist in preventing vessels encountering such hazards.

14.6.2.7.2 Search and Rescue Access

Separate to this chapter, the Project has undertaken an assessment of SAR access. This assessment (Appendix E : Safety Justification undertaken by NASH Maritime, located in Appendix 14-1) notes that "whilst the Project layout is not a regular grid, it does integrate several of the underlying elements of best practice to ensure the safety and effectiveness of SAR operations. These elements include maintaining consistent lines of orientation, establishing clear SAR routes and creating a Helicopter Refuge Area (HRA) with well-defined entry and exit points". The Safety Justification identified several key conclusions:

- The Offshore Site is heavily constrained with numerous competing constraints, particularly natural ground conditions, which makes a viable regular grid layout impossible. The existing guidance (both DoT and MCA) note that projects should be considered on a case-by-case basis and that deviations from regular grid layouts and two lines of orientation can occur, which is necessary with the unique constraints of the Project, given sufficient safety justification.
- Sceirde Rocks is also a small project, at 3.1 NM by 3.8 NM, and as noted in the guidance (MCA, 2024), the key principles of the guidance have been developed specifically for large offshore projects >10 NM across.
- The layout proposed does seek to integrate as far as practically possible several of the underlying elements of best practice to ensure the safety and effectiveness of SAR operations.
- The incorporation of two parallel lines of orientation, approximately 1,020 m apart, aligns the majority of the infrastructure and forms a central area clear of WTGs. This structured layout could provide for safe and efficient SAR operations and general navigation within the wind farm.
- The Inter-WTG Route, a 500 m wide swath around the OAA, further supports SAR activities by providing additional offsets from WTGs and ensuring direct entry and exit points on each corner of the OAA. This route maintains more than a 75 m offset from any infrastructure, with most offsets exceeding 100 m.
- The proposed HRA, spanning 1.9 NM^2, provides a possible area for SAR helicopters to reorient and manoeuvre safely. The HRA exceeds the 1 NM guidance and is offset from all infrastructure by more than 250 m, ensuring minimal obstruction.
- Furthermore, the design includes five entry and exit routes for the HRA, all bearing 064˚ /244˚, which aligns with the northwest line of orientation. These routes, each 500 m wide, ensure more than 150 m of additional separation from any WTG, enhancing safety during SAR operations.
- As concluded in the NRA, the risk of a navigational incident occurring within the OAA is low due to the low density of traffic and risk profile and therefore it is unlikely that SAR activities will be required within the OAA.
- The Project has proposed mitigation which would manage SAR provision at Sceirde Rocks.
- There is a pressing need for increased offshore wind farms in Ireland.

On the basis of this assessment this risk is deemed to be Tolerable with Mitigation (ALARP) noting the Project has 'committed to engaging further with the IRCG to ensure that the Project satisfies their requirements and would not compromise the safety and efficiency of SAR operations'.

14.6.2.7.3 Mitigation by Design

Embedded mitigation measures identified as relevant to reducing the significance of effect are as follows:

- Compliance with MGN 654 and its annexes;
- Guard vessel(s);
- Marine coordination for Project vessels;
- Pollution planning; and
- Project vessel compliance with international marine regulations.

14.6.2.7.4 Potential Significance of Effect

The frequency of occurrence and severity of consequence for each phase of the Offshore Site is presented in Table 14-18 alongside the resulting significance of effect, noting this includes consideration of conclusions from Appendix E : Safety Justification undertaken by NASH Maritime, located in Appendix 14-1.

Table 14-18 Significance of Effect for Reduction of Emergency Response Capability Including SAR Access

Phase	Frequency of Occurrence	Severity of Consequence	Significance of Effect
Operation and maintenance	Remote	Serious	Tolerable with Mitigation (ALARP)

In summary, the significance of the impact is Tolerable with Mitigation (ALARP), which is Not Significant.

14.7 Residual Effects

A summary of the significance of each impact is presented in Table 14-19, alongside its resulting residual effect. As no additional mitigations have been identified for any of the effects, no significant adverse residual effects of the Offshore Site are predicted.

Table 14-19 Summary of Impact Significances

Effect	Phase	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Residual Effect	Significance of Residual Effect
Vessel Displacement	Construction	Frequent	Negligible	Tolerable with Mitigation (ALARP); Not Significant	N/A	Tolerable with Mitigation (ALARP); Not Significant
	Operation and maintenance	Frequent	Negligible	Tolerable with Mitigation (ALARP); Not Significant	N/A	Tolerable with Mitigation (ALARP); Not Significant
	Decommissioning	Frequent	Negligible	Tolerable with Mitigation (ALARP);	N/A	Tolerable with Mitigation (ALARP);

				Not Significant		Not Significant
Third-party vessel to vessel collision risk	Construction	Extremely unlikely	Moderate	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
	Operation and maintenance	Extremely unlikely	Moderate	Broadly Acceptable (ALARP); Not Significant	N/A	Tolerable with Mitigation (ALARP); Not Significant
	Decommissioning	Extremely unlikely	Moderate	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
Collision risk between third-party vessels and Project vessels	Construction	Extremely unlikely	Moderate	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
	Operation and maintenance	Extremely unlikely	Moderate	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
	Decommissioning	Extremely unlikely	Moderate	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
Reduced access to local ports	Construction	Remote	Negligible	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
	Operation and maintenance	Remote	Negligible	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
	Decommissioning	Remote	Negligible	Broadly Acceptable (ALARP);	N/A	Broadly Acceptable (ALARP);

				Not Significant		Not Significant
Creation of third-party allision risk	Operation and maintenance	Remote	Moderate	Tolerable with Mitigation (ALARP); Not Significant	N/A	Tolerable with Mitigation (ALARP); Not Significant
Reduction in under-keel clearance	Operation and maintenance	Extremely unlikely	Moderate	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
Anchor interaction with subsea infrastructure	Operation and maintenance	Negligible	Minor	Broadly Acceptable (ALARP); Not Significant	N/A	Broadly Acceptable (ALARP); Not Significant
Reduction in emergency response capability	Operation and maintenance	Remote	Serious	Unacceptable; Significant	Safety justification	Tolerable with Mitigation (ALARP); Not Significant

14.8 Cumulative Effects

14.8.1 Methodology

The impacts identified in Section 14.6.2 are also assessed for cumulative effects with the inclusion of other planned projects. For Shipping and Navigation, given the international nature of shipping, other planned projects within 50 NM are considered and screened as part of the NRA process.

The 50 NM radius is considered to be best practice based on consultation and experience with previously consented offshore wind developments and allows consideration of vessels as they approach and depart the OAA to identify where there may be multiple deviations associated with different (cumulative) planned projects. Any deviations associated with planned projects that are further than 50 NM are considered to be mitigated by the length of the transit/journey.

For other planned projects, an exercise is undertaken to determine which should be incorporated into the cumulative assessment of likely significant effects. Factors considered in addition to the distance from the Offshore Site include development status, level of interaction with Shipping and Navigation receptors associated with the Offshore Site, consultation feedback, and data confidence.

Identified cumulative planned projects are listed in the following subsections.

14.8.1.1 Offshore Renewables

The Project is the only Relevant Project / Phase 1 offshore renewable development in the region with a Maritime Area Consent (MAC), the only offshore wind development in the region which was successful

in Offshore Renewable Electricity Support Scheme (ORESS) 1 and the only offshore wind development in the region which is permitted to make a planning application.

A number of offshore renewable developments (at various levels of inception) were proposed to be developed off the western coast of Ireland before the State's policy changed to a plan-led regime. Current policy is such that none of these projects are permitted to seek a MAC or make a planning application. Whether any of them may progress in the future is entirely dependent on future policy decisions.

The Project is the only Relevant Project / Phase 1 offshore renewable development in the region with a MAC, the only offshore wind development in the region which was successful in Offshore Renewable Electricity Support Scheme (ORESS) 1 and the only offshore renewable energy development in the region, which is permitted to make a planning application.

There were a number of planned offshore renewable developments (at various levels of inception) proposed to be developed off the western coast of Ireland before the State's policy changed to a plan-led regime. The previously planned offshore renewable developments which are within 50 NM of the Offshore Site (as per the methodology outlined in Section 14.8.1) include:

- Atlantic Offshore Renewable Energy 1;
- Atlantic Offshore Renewable Energy 2;
- Clarus Offshore Wind Farm;
- Ilen Array Offshore Wind Farm;
- Inis Offshore Wind Kerry;
- Inis Offshore Wind Munster;
- Mainstream Tralee Wind Farm;
- Moneypoint Offshore Wind Farm;
- Rian Offshore Array;
- Saoirse Wave Energy; and
- Western Star Floating Wind.

Current policy is such that none of these projects are permitted to seek a MAC or make a planning application. However, whether any of them may progress in the future is entirely dependent on future policy decisions. Several foreshore licence applications have been made, primarily in relation to environmental surveys in support of these renewables developments. In this context, there is insufficient information to consider these renewables developments, or associated foreshore licences for survey works any further.

It is also noted that no cumulative concerns were raised during consultation for Appendix 14-1: NRA in relation to offshore renewable developments.

14.8.1.2 Subsea Cables

During the Hazard Workshop, the following planned subsea cable developments were identified in the region:

- Far North Fiber; and
- PISCES.

Both of these developments are planned to make landfall within Galway Bay, and therefore are expected to cross the OECC.

Each will be subject to a cable burial risk assessment similar to that required for the Project. Therefore, the likelihood of any crossings giving rise to additional Shipping and Navigation risk due to their physical presence is considered negligible, noting that no concerns were raised during consultation with local ports familiar with traffic movements in the area (see Section 14.3). Should activities associated

with installation or maintenance coincide with that for the Project then it is expected that suitable coordination between the projects will be established to minimise disruption, noting that the footprint of such works for subsea cables will be small.

Therefore, neither of these subsea cable developments are relevant to the cumulative assessment of likely significant effects.

14.8.2 Cumulative Summary

All planned offshore renewable (see Section 14.8.1.1) or subsea cable developments (see Section 14.8.1.2) with the potential to have a cumulative environmental impact with the Project have been considered. Following an assessment of likely cumulative effects, there have been no likely effects identified that would require further assessment with regard to Shipping and Navigation.

14.9 Summary

Information on Shipping and Navigation within the OAA study area was collected via dedicated shore-based vessel traffic surveys, additional desktop studies of historical incident data, nautical charts, and the local Admiralty Sailing Directions, in addition to consultation outreach with key stakeholders including a Hazard Workshop.

Effects of the Offshore Site on Shipping and Navigation receptors include displacement of third-party vessels and resulting increased collision risk, collision risk between third-party vessels and Project vessels, reduced access to local ports, creation of third-party allision risk, reduction in under-keel clearance due to cable protection, anchor interaction with subsea infrastructure, and reduction in emergency response capability.

Overall, it is concluded that the effects of all potential impacts are assessed as being either Broadly Acceptable or Tolerable with Mitigation, which is Not Significant.

- The effects of a potential impact relating to vessel displacement has been assessed as Tolerable with Mitigation for all phases.
- The effects of a potential impact relating to increased vessel to vessel collision risk between third-party vessels has been assessed as Broadly Acceptable for all phases.
- The effects of a potential impact relating to increased vessel to vessel collision risk between a third-party vessel and a Project vessel has been assessed as Broadly Acceptable for all phases.
- The effects of a potential impact relating to the creation of vessel to structure allision risk has been assessed as Tolerable with Mitigation.
- The effects of a potential impact relating to the reduction of under-keel clearance has been assessed as Broadly Acceptable.
- The effects of a potential impact relating to anchor interaction with subsea infrastructure has been assessed as Broadly Acceptable.
- The effects of a potential impact relating to the reduction of emergency response capability (including SAR access) has been assessed as Tolerable with Mitigation with consideration of Appendix E : Safety Justification undertaken by NASH Maritime, located in Appendix 14-1.

Following an assessment of likely cumulative effects, it is not predicted that there will be any significant cumulative effects arising from the Offshore Site alongside other developments.

Abbreviations

Abbreviation	Definition
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
ARPA	Automatic Radar Plotting Aid
AtoN	Aid to Navigation
CD	Chart Datum
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea
CCTV	Closed Circuit Television
DCCAE	Department of Communications, Climate Action and Environment
DoT	Department of Transport
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
FLO	Fisheries Liaison Officer
FSA	Formal Safety Assessment
GBS	Gravity Based Structure Fixed-Bottom Foundation
GT	Gross Tonnage
HAT	Highest Astronomical Tide
HRA	Helicopter Refuge Area
IAA	Irish Aviation Authority
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IMO	International Maritime Organization
INTOG	Innovation and Targeted Oil and Gas
IRCG	Irish Coastguard
km	Kilometre

LMP	Lighting and Marking Plan
MAC	Maritime Area Consent
MAIB	Marine Accident Investigation Branch
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Maritime and Coastguard Agency
MCIB	Marine Casualty Investigation Board
MGN	Marine Guidance Note
MPCP	Marine Pollution Contingency Plan
MSO	Marine Survey Office
NIS	Natura Impact Statement
NM	Nautical Mile
NM^2	Square Nautical Mile
NRA	Navigational Risk Assessment
OAA	Offshore Array Area
OEC	Offshore Export Cable
OECC	Offshore Export Cable Corridor
OREI	Offshore Renewable Energy Installation
ORESS	Offshore Renewable Electricity Support Scheme
OSS	Offshore 220kV Electrical Substation
PLB	Personal Location Beacon
PLL	Potential Loss of Life
RAM	Restricted in Ability to Manoeuvre
RNLI	Royal National Lifeboat Institution
RYA	Royal Yachting Association
SAR	Search and Rescue
SOLAS	International Convention for the Safety of Life at Sea
TCE	The Crown Estate
UK	United Kingdom

UKHO	United Kingdom Hydrographic Office
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
VHF	Very High Frequency
WTG	Wind Turbine Generator