Spiorad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Chapter 16: Shipping and Navigation, Volume 2a

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16 SHIPPING AND NAVIGATION

16.1 INTRODUCTION

16.1.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) presents the results of the assessment of the likely significant effects of the proposed Spiorad na Mara Offshore Wind Farm (hereafter referred to as 'the Offshore Project') with respect to Shipping and Navigation including third-party vessels, ports and related services, and emergency responders.

16.1.1.2 This chapter should be read in conjunction with the project description provided in **Chapter 3: Project Description, Volume 1a** and the relevant parts of the following chapters and appendices:

- **Chapter 6: Socio-economics, Volume 2a** (ports and harbours are considered in this chapter from a safety of navigation perspective);
- **Chapter 17: Military and Civil Aviation, Volume 2a** (due to consideration of military and civil aviation receptors from a safety of navigation perspective including emergency response to a marine incident);
- **Chapter 20: Other Sea Users, Volume 2a** (due to the consideration of specific recreational impacts, including those relating to boat tours);
- **Chapter 21: Commercial Fisheries, Volume 2a** (due to the consideration of specific fishing vessel impacts, including displacement from fishing grounds and gear snagging).

16.1.1.3 This technical chapter describes the following:

- Legislation, planning policy and other documentation that has informed the assessment (Section 16.2);
- Outcome of consultation and engagement that has been undertaken to date, including how matters relating to Shipping and Navigation have been addressed (Section 16.3);
- Scope of the assessment for Shipping and Navigation (Section 16.3.4);
- The methods of assessment used for baseline data gathering and impact assessment (Section 16.5);
- Overall baseline (Section 16.6);
- Embedded environmental measures relevant to Shipping and Navigation and the relevant maximum design scenario (Section 16.7);
- Assessment of Shipping and Navigation likely significant effects and secondary mitigation (Section 16.8 - 16.10);
- Assessment of Shipping and Navigation Combined effects (Section 16.11);
- Assessment of Shipping and Navigation Whole Project effects (Section 16.12);
- Assessment of Shipping and Navigation Cumulative effects (Section 16.13);
- Assessment of transboundary effects (Section 16.14)

- A summary of residual effects for Shipping and Navigation (Section 16.15);
- Glossary and abbreviations used in the Shipping and Navigation assessment (Section 16.16: Glossary of terms and abbreviations);
- Information sources and documentation referred to in this chapter (Section 16.17).

16.1.1.4 The chapter is supported by the following appendices and figures:

- **Appendix 16.1: Navigations Risk Assessment, Volume 2c;**
- **Figures 16-1 to 16-5 in Chapter 16: Shipping and Navigation figures, Volume 2b;**
- **Outline Marine Pollution Contingency Plan, Volume 3;**
- **Outline Navigational Safety and Vessel Management Plan, Volume 3;**
- **Outline Lighting and Marking Plan, Volume 3.**

16.2 SUMMARY OF POLICY AND LEGISLATIVE CONTEXT

16.2.1.1 This section outlines the legislation, policy, and guidance that is relevant to the assessment of likely significant effects on Shipping and Navigation associated with the construction, operation and maintenance (O&M), and decommissioning of the Offshore Project. In addition, other national, regional, and local policies are considered within this assessment where they are judged to be relevant. Further information on policies relevant to the EIAR is provided in **Chapter 2: Policy and Legislative Context, Volume 1a**.

16.2.1.2 A summary of the legislative, policy and guidance relevant to Shipping and Navigation is provided in **Table 16-1** which examined their relevance to the assessment **Table 16-1**.

Table 16-1 Legislation, policy, and guidance for Shipping and Navigation

Title	Description
Legislation	
Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1972/77).	The COLREGs define the rules which must be adhered to by all vessels navigating internationally and governs the conduct of vessels to minimise the risk of collisions. The COLREGs in full are considered throughout with particular regard in the context of the Offshore Project to collision avoidance (Rule 8) and conduct of vessels in restricted visibility (Rule 19) when considering collision risk in the impact assessment in Section 16.8 to Section 16.11. Offshore Project vessel compliance with COLREGs is included as an embedded mitigation measure (see Section 16.7.2).
International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974).	SOLAS is an international agreement that specifies the basic minimum requirements for the construction, equipment and operation of vessels, compatible with their safety.

Title	Description
	SOLAS in full is considered throughout with particular regard in the context of Offshore Project to rendering assistance to persons in distress (Regulation 33) and passage planning (Regulation 34) when considering allision risk, anchor interaction with sub-sea cables and emergency response capability in Section 16.8 to Section 16.11. Offshore Project vessel compliance with SOLAS is included as an embedded mitigation measure (see Section 16.7.2).
United Nations Convention on the Law of the Sea (UNCLOS) (United Nations (UN), 1982).	UNCLOS defines the rights and responsibilities of all parties with respect to their use of the sea throughout the world, sets out the legal framework for the seas and oceans, and regulates the use of marine resources. Internationally recognised sea lanes and other identified routes are considered in the shipping and navigation baseline (see Section 16.6.1) and have been considered wherever "*interference may be caused*" including through vessel displacement, port access, collision risk and allision risk in the impact assessment in Section 16.8 to Section 16.11.
Policy	
United Kingdom (UK) Marine Policy Statement (HM Government, 2011).	The UK Marine Policy Statement provides a framework for preparing Marine Plans and taking decisions affecting the marine environment. The UK Marine Plan sets out how marine plan authorities and decision makers should consider and seek to minimise any negative impacts on shipping activity, freedom of navigation and navigational safety and ensure that their decisions are in compliance with international maritime law. Displacement of existing routes and activity and subsequent increases in collision risk have been considered in the impact assessment in Section 16.8 to Section 16.11.
Scotland's National Marine Plan (Scottish Government, 2015).	Sets out how navigational safety in relevant areas used by shipping now and in the future should be protected. All marine planning policies for shipping, ports, harbours and ferries have been considered fully throughout the Shipping and Navigation assessment. Regard is given to the displacement of main commercial routes and other marine activities such as anchoring activity in Section 16.8 to Section 16.11.
Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020).	Aims to identify sustainable plan options for the future development of commercial-scale offshore wind energy in Scotland, including deep

Title	Description
	water wind technologies, and covers both Scottish inshore and offshore waters.
Guidance	
Marine Guidance Note (MGN) 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response and its annexes (Maritime and Coastguard Agency (MCA), 2021).	Highlights issues that shall be considered when assessing the potential effect on navigational safety and emergency response (search and rescue (SAR), salvage and towing, and counter pollution) from offshore renewable energy developments proposed in UK internal waters, territorial sea or Renewable Energy Zones. Compliance with MGN 654 and its annexes is included as an embedded mitigation measure (see Section 16.7.2) and considered throughout the impact assessment in Section 16.8 to Section 16.11.
Revised Guidelines for Formal Safety Assessment (FSA) for Use in the Rule-Making Process (IMO, 2018).	A rational and systematic process for assessing the risks associated with shipping activity and for evaluating the costs and benefits of IMO's options for reducing these risks (see Section 16.5.2).
MGN 372 Amendment 1 (Merchant and Fishing) Offshore Renewable Energy Installations (OREI): Guidance to Mariners Operating in the Vicinity of UK OREIs (MCA, 2022).	Highlights the issues to be considered when planning and undertaking voyages in the vicinity of OREIs in UK waters. This is considered throughout the impact assessment in Section 16.8 to Section 16.11.
International Organization for Marine Aids to Navigation (IALA) Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA, 2021).	Gives recommendations on the marking requirement for man-made structures in the marine environment. This includes subsea, surface piercing, floating, and fixed structures as well as those placed above navigable channels to ensure the safety of vessel traffic. This is included as an embedded mitigation measure (see Section 16.7.2) and is considered throughout the impact assessment in Section 16.8 to Section 16.11.
IALA Guidance G1162 The Marking of Offshore Man-Made Structures Edition 1.1 (IALA, 2022).	Guidance defining the marking of structures considered a minimum requirement to ensure the safety of navigation in the vicinity of the structures. This is included as an embedded mitigation measure (see Section 16.7.2) and is considered throughout the impact assessment in Section 16.8 to Section 16.11.
IALA Guidance G1185 Enhancing the Safety and	Guidance based on current best practice and knowledge when considering navigational safety issues in and around OREI. This is

Title	Description
Efficiency of Navigation around Offshore Renewable Energy Installations (IALA, 2024).	considered throughout the impact assessment in Section 16.8 to Section 16.11.
The Royal Yachting Association's (RYA) Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy (RYA, 2019).	Sets out recreational boating concerns in relation to offshore renewable wind energy for consideration when developing their NRAs. This is considered throughout the impact assessment in Section 16.8 to Section 16.11.
The World Association for Waterborne Transport Infrastructure (PIANC) Report 161 Interaction Between Offshore Wind Farms and Maritime Navigation (PIANC, 2018).	Guidance for assessing sufficient manoeuvring space and the minimal distance between navigation and offshore installations. This is considered throughout the impact assessment in Section 16.8 to Section 16.11.

16.3 SCOPING AND CONSULTATION

16.3.1 OVERVIEW

16.3.1.1 This section describes the stakeholder engagement undertaken for the Offshore Project. This consists of early engagement, the outcome of, and response to, the Scoping Opinion in relation to the Shipping and Navigation assessment, informal consultation, and consultation undertaken through the Preliminary Application Consultation (PAC) process (hereafter referred to as 'the formal consultation'). An overview of engagement undertaken for the Offshore Project as a whole can be found in **Chapter 5: Approach to EIA, Volume 1a**.

16.3.1.2 Consultation is a key feature of the EIA process and continues throughout the lifecycle of the Offshore Project, from the initial stages through to consent and post consent.

16.3.1.3 Consultation captures all consultation and engagement and has been ongoing with a number of prescribed and non-prescribed consultation bodies and local authorities in relation to Shipping and Navigation. All consultation to date has been undertaken in line with the process described in **Chapter 5, Volume 1a**. Feedback received during this process has been incorporated into the EIAR wherever possible as appropriate.

16.3.2 EARLY ENGAGEMENT

16.3.2.1 Outreach to key stakeholders was undertaken to discuss the need for scoping workshops. Following these discussions, it was mutually agreed that, due to the prescribed nature of the assessment methodology (see Section 16.2), scoping workshops were not required at that stage by either the stakeholders or the Applicant.

16.3.3 SCOPING OPINION

16.3.3.1 Spiorad na Mara Limited (hereafter referred to as 'the Applicant') submitted a Scoping Report (Spiorad na Mara limited, 2023) and request for a Scoping Opinion to the Marine Directorate - Licensing Operations Team (MD-LOT) in September 2023. A Scoping Opinion was received in May 2024. The Scoping Report sets out the proposed Shipping and Navigation assessment methodologies, outline of the baseline data collected to date and proposed, and the scope of the assessment. The comments received in the Scoping Opinion and how these have been addressed in this EIAR is provided in **Appendix 5.2: Response to Scoping Opinion, Volume 1c**.

16.3.3.2 A summary of those responses relevant to Shipping and Navigation is shown in **Table 16-2**. Regard has also been given to other stakeholder comments that were received in relation to the Scoping Report.

Table 16-2 Scoping Opinion responses for Shipping and Navigation

Consultee	Date / Document	Comment	Response / where this is addressed in the EIAR
MD-LOT	May 2024, Scoping Opinion	The Scottish Ministers are content with the 10 nautical mile (nm) study area proposed for shipping and navigation, however, in line with UK Chamber of Shipping representation, highlights that a 50 nm routeing study area for cumulative impacts should be considered in the EIAR.	A wider 50 nm Study Area is included for assessing cumulative routeing (see Section 16.11).
		The Scottish Ministers, in line with the UK Chamber of Shipping representation, recommend 20 years of Marine Accident Investigation Branch (MAIB) spatial accident data is used to inform the baseline for the EIAR.	**Appendix 16.1, Volume 2c** includes assessment of a total of 20 years of MAIB data as well as Section 16.6.1.
		The Scottish Ministers do not agree that the proposed 2 x 14 day full surveys, as stated in Section 6.10.6.1 of the Scoping Report, are sufficient. The Scottish Ministers advise a full 12 months of Automatic Identification System (AIS) data is used to inform the vessel traffic survey. This is a view supported by UK Chamber of Shipping in its representation.	**Appendix 16.1, Volume 2c** considers 12 months of AIS data within Appendix E.
		The Scottish Ministers, in line with the UK Chamber of Shipping and MCA representations, request careful consideration of vessel routes, with particular regard to adverse weather conditions, as well as an analysis of the safety of navigations in the channel between the Isle of Lewis/*Eilean Leòdhais* and the Offshore Proposed Development.	Main commercial routes are considered in Section 11 within **Appendix 16.1, Volume 2c**, and anticipated main commercial route deviations have been defined for the Offshore Project in isolation and cumulatively (see Section 19 within **Appendix 16.1, Volume 2c**). Adverse weather routeing is considered in Section 12 within **Appendix 16.1, Volume 2c**.
		Additionally, the Scoping Report identifies rig moves taking place on occasion in the area of the Offshore Proposed Development.	**Appendix 16.1, Volume 2c** considers 12 months of AIS data within Appendix E and no regular rig moves

Consultee	Date / Document	Comment	Response / where this is addressed in the EIAR
		Due to the risks associated with these navigational movements, the Scottish Ministers, in line with the UK Chamber of Shipping representation, request long term analysis of rig moves.	were identified. One rig move was identified as temporary and recorded within the Deep Water Route (DWR). This is considered in Section 16.9.5. Section 9 within **Appendix 16.1, Volume 2c** considers the *Transocean Winner* incident and analysis of long-term MAIB data.
		The UK Chamber of Shipping raises concerns of possible visual impacts to mariners of the Aird Laimishader Lighthouse due to the height and lighting of the Offshore Proposed Development. The Scottish Ministers request that the Developer fully consider this impact and includes proposed mitigation measures in the EIAR.	This impact is considered in Sections 16.8, 16.9, and 16.10.
		The Scottish Ministers advise that the potential impact of loss of navigational aid due to adverse weather conditions should be scoped in. This is a view supported by RYA in its representation.	This is considered within Section 16.9.
		Scottish Ministers confirm that a Navigational Risk Assessment (NRA) should be submitted in accordance with MGN 654, alongside a MGN 654 Checklist. Hydrographic surveys should fulfil the requirements of MGN 654 Annex 4. To note, MGN 372 (2008) is superseded by MGN 372 Amendment 1 (2022). This is in line with MCA representation.	The relevant MCA guidance has been considered (see Section 16.2). A completed NRA and MGN 654 Checklist can be found in Appendix A within **Appendix 16.1, Volume 2c**.
		The Scottish Ministers also draw the Developer's attention to the MCA representation with regard to SAR Emergency Response Cooperation Plans (ERCoPs), levels of radar surveillance, AIS and shore based Very High Frequency (VHF) radio coverage. The Scottish Ministers advise that the MCA representation must be fully addressed within the EIAR and that a SAR checklist must be completed by the Developer in consultation with the MCA.	As per Section 16.7.2, there will be full MGN 654 compliance, including in relation to MCA SAR requirements.

Consultee	Date / Document	Comment	Response / where this is addressed in the EIAR
		The Scottish Ministers, in line with the MCA representation, advise that subject to traffic volumes, an anchor penetration study may be required.	As per Section 16.7.2, there will be full MGN 654 compliance, including in relation to anchor studies and water depth reductions. A cable burial risk assessment (CBRA) will be undertaken post consent (outlined in M030).
		With regard to cabling routes and cable burial, the Scottish Ministers advise that a Burial Protection Index should be completed. The Scottish Ministers advise that this should be fully addressed in the EIAR and highlight the MCA advice on a maximum 5% reduction in surrounding depth referenced to Chart Datum (CD) if cable protection measures are required. Additionally, the Scottish Ministers direct the Developer to the MCA representation regarding consideration of electromagnetic deviation on ships' compasses and the requirement for a compass deviation study should High Voltage Direct Current (HVDC) installation be considered. The MCA advice in this respect must be fully addressed and implemented in the EIAR in so far as it relates to the Proposed Development.	As per Section 16.7.2, there will be full MGN 654 compliance, including in relation to water depth reductions. A CBRA will be undertaken post consent (outlined in M030). HVDC is no longer under consideration (see **Chapter 3, Volume 1a**).
		The Scottish Ministers, in line with the UK Chamber of Shipping, encourage as close to full removal of all infrastructure as possible, during decommissioning, noting that infrastructure left on the seabed may be a risk to other sea users or a constraint on future activity in the area.	Section 16.10 considers decommissioning activities that will include full removal of subsea infrastructure. Decommissioning activities will be subject to the relevant guidance at the time.
MCA	15 December 2023, Scoping Opinion	The EIAR should supply detail on the possible impact on navigational issues for both commercial and recreational craft, specifically: • Collision Risk;	The listed impacts are assessed within Sections 16.8, 16.9, and 16.10.

Consultee	Date / Document	Comment	Response / where this is addressed in the EIAR
		• Navigational Safety; • Visual intrusion and noise; • Risk Management and Emergency response; • Marking and lighting of site and information to mariners; • Effect on small craft navigational and communication equipment; • The risk to drifting recreational craft in adverse weather or tidal conditions; • The likely squeeze of small craft into the routes of larger commercial vessels.	
		The development area carries a moderate amount of traffic. Attention needs to be paid to routing, particularly in heavy weather so that vessels can continue to make safe passage without large-scale deviations.	Anticipated main commercial route deviations have been defined for the Offshore Project in isolation and cumulatively (see Section 19 within **Appendix 16.1, Volume 2c**). Adverse weather routeing is considered in Section 12 within **Appendix 16.1, Volume 2c**.
		An NRA will need to be submitted in accordance with MGN 654. This NRA should be accompanied by a detailed MGN 654 Checklist.	The relevant MCA guidance has been considered (see **Section 16.2**). A completed NRA and MGN 654 Checklist can be found in Appendix A within **Appendix 16.1, Volume 2c**.
		The Development Specification and Layout Plan (DSLP) will require MCA approval prior to construction to minimise the risks to surface vessels, including rescue boats, and SAR aircraft operating within the site. Any additional navigation safety and/or SAR requirements, as per MGN 654 Annex 5, will be agreed at the approval stage.	As per Section 16.7.2, compliance with MGN 654 is included as an embedded mitigation measure including SAR requirements.

Consultee	Date / Document	Comment	Response / where this is addressed in the EIAR
		Attention should be paid to cabling routes and where appropriate, burial depth for which a Burial Protection Index study should be completed and, subject to the traffic volumes, an anchor penetration study may be necessary. If cable protection measures are required e.g., rock bags or concrete mattresses, the MCA would be willing to accept a 5% reduction in surrounding depths referenced to CD. This will be particularly relevant where depths are decreasing towards shore and potential impacts on navigable water increase, such as at the Horizontal Directional Drilling (HDD) location.	As per Section 16.7.2, there will be full MGN 654 compliance including in relation to anchor studies and water depth reductions. A CBRA will be undertaken post consent (outlined in M030).
		A SAR checklist will also need to be completed in consultation with MCA, as per MGN 654 Annex 5 SAR requirements.	As per Section 16.7.2, there will be full MGN 654 compliance including in relation to MCA SAR requirements.
		MGN 654 Annex 4 requires that hydrographic surveys should fulfil the requirements of the International Hydrographic Organisation (IHO) Order 1a standard.	As per Section 16.7.2, there will be full MGN 654 compliance including in relation to hydrographic surveys.
		If HVDC cables are being considered as the export cable, consideration must be given to the effect of electromagnetic deviation on ships' compasses.	HVDC is no longer under consideration (see **Chapter 3, Volume 1a**).
		Agree with the methodology, study area, data sources identified and proposed vessel traffic surveys outlined in the Scoping Report and all potential impacts have been identified. On the understanding that the Shipping and Navigation aspects are undertaken in accordance with MGN 654 and its annexes, along with a completed MGN checklist, MCA is likely to be content with the approach.	Methodology is as per set out in the Scoping Report (Spiorad na Mara limited, 2023). Embedded mitigation measures are detailed in Section 16.7.2. A completed MGN 654 Checklist is provided in Appendix A within **Appendix 16.1, Volume 2c**.

Consultee	Date / Document	Comment	Response / where this is addressed in the EIAR
NLB	30 October 2023, Scoping Opinion	NLB have no objection to the content of the Scoping Report, and no suggestions for additional content	The NRA methodology set out in Section 3 within **Appendix 16.1, Volume 2c** is as per the Scoping Report (Spiorad na Mara limited, 2023).
RYA Scotland	30 October 2023, Scoping Opinion	The UK Coastal Atlas of Recreational Boating and Clyde Cruising Club Sailing Directions and Anchorages should be considered.	The relevant data sources are presented in Section 16.5. Anchorages are identified in Section 16.6.1.
		Relatively few recreational vessels currently pass up the west coast of Lewis to round the Butt of Lewis/*Rubha Robhanais* as there is no safe shelter between Loch Roag/*Loch Ròg* and the Butt of Lewis/*Rubha Robhanais*. Some may be circumnavigating the UK and Ireland and others may be heading from St Kilda/*Hiort* to Stornoway/*Steòrnabhagh*.	This aligns with vessel traffic data as presented in Section 16.6.1.
		The round Britain and Ireland yacht race is held every 4 years, the last being in 2022, with the route going through, or close to, the proposed site. Thus, as mentioned in the Scoping Report, some recreational vessels do pass through the site area.	Recreational activity is presented in Section 16.6.1 with long-term analysis in Appendix E within **Appendix 16.1, Volume 2c**. Recreational activity within the Array Area is minimal and it is understood that the race route passes west of St Kilda/*Hiort* and Sula Sgeir which are approximately 56 nm southwest and 40 nm northeast of the Array Area, respectively.
		Skippers of vessels in these challenging waters are likely to be experienced and self-sufficient.	This is considered in Sections 16.8, 16.9, and 16.10.
		It is thought that fewer than half the recreational craft in these waters transmit an AIS signal, although there is no need to collect additional data.	The methodology is as per the Scoping Report (Spiorad na Mara limited, 2023).
		Another effect that should be added is the danger of losing navigational aids such as lights and AIS signals due to storm damage, and the difficulty of repairing them timeously.	This is considered within Section 16.9.

Consultee	Date / Document	Comment	Response / where this is addressed in the EIAR
		Agree with the methodology outlined for assessing potential impacts in the Scoping Report and with the embedded mitigation measures outlined.	The methodology and embedded mitigation measures are set out in Section 16.5 and Section 16.7.2 respectively, and are as per the Scoping Report (Spiorad na Mara limited, 2023).
UK Chamber of Shipping	19 October 2023, Scoping Opinion	Strongly advocates that when the Offshore Wind Farm (OWF) is to be fully decommissioned, there should be the full removal of all infrastructure above and below the seabed, acknowledging Best Available Technology Not Entailing Excessive Cost (BATNEEC) when it comes to turbine foundations which penetrate deep into the seabed. This explicitly includes Array Cables to WTGs and Array Cables to Landfall.	Section 16.10 considers decommissioning activities that will include full removal of subsea infrastructure. Decommissioning activities will be subject to the relevant guidance at the time.
		Wish to see a 50 nm study area for cumulative impacts. This is industry standard for large projects such as this as provides for wider impact analysis of the development.	A wider 50 nm Study Area is included for assessing cumulative routeing (see Section 16.11).
		Safety concerns with interference and visual impediment of Aird Laimishader Lighthouse, which has a rated visibility of 8 nm, from the many OWF structures, given their greater height and lighting, which will result in "*visual clutter*" for mariners. The Chamber wishes to see analysis into the impact of and mitigation measures considered for safety of navigation.	This impact is considered in Sections 16.8, 16.9, and 16.10.
		The Chamber wishes to see further analysis of routes passing inshore of the Array Area and the safety of navigation as well as potential anchoring activity in the bay.	Main commercial routes are considered in Section 11 within **Appendix 16.1, Volume 2c**, and anchored vessels within Section 16.6.1. Section 16.6.1 also identifies anchorages.
		Rig moves are safety critical and important navigational movements, and the Chamber wishes to see careful longer term analysis of this type of navigation, in particular recognising that a	**Appendix 16.1, Volume 2c** considers 12 months of AIS data within Appendix E and no regular rig moves were identified. One rig move was identified as

Consultee	Date / Document	Comment	Response / where this is addressed in the EIAR
		rig stranding occurred in Lewis in the last 10 years at considerable cost and consequence.	temporary and recorded within the DWR. This is considered in Section 16.9.5. Section 9 within **Appendix 16.1, Volume 2c** considers the *Transocean Winner* incident and analysis of long-term MAIB data.
		Wish to see a full 12 months of AIS data for a longer term vessel traffic survey, in particular to consider adverse weather and any rig moves that may be captured.	**Appendix 16.1, Volume 2c** considers 12 months of AIS data within Appendix E and no regular rig moves were identified. One rig move was identified as temporary and recorded within the DWR. This is considered in Section 16.9.5.
		For long term projects such as OWFs, examining 10 years of accident data is not truly representative of trends and historic incidents. As such the Chamber recommends that 20 years of MAIB spatial accident data be included in the EIA baseline.	**Appendix 16.1, Volume 2c** includes assessment of a total of 20 years of MAIB data as well as Section 16.6.1.

16.3.4 POST SCOPING CONSULTATION

16.3.4.1 Following the receipt of the Scoping Opinion, further consultation relating to Shipping and Navigation has been held with a number of stakeholders.

16.3.4.2 During February 2025, a Hazard Workshop was held, as recommended under MGN 654, to allow local users and identified stakeholders to provide feedback for the NRA and to further risk assess vessel traffic movements and potential interactions with the Offshore Project. The output of the Hazard Workshop is the Hazard Log, presented in **Appendix 16.1, Volume 2c**, which is used as the basis of the impact assessment undertaken in Sections 16.8 to 16.11 and Sections 17 and 19 within **Appendix 16.1, Volume 2c**. The Hazard Workshop was held on the Isle of Lewis/*Eilean Leòdhais* and was attended, either in-person or virtually, by the following stakeholders:

- UK Chamber of Shipping;
- MCA;
- Northern Lighthouse Board (NLB);
- Scottish Fishermen's Federation (SFF);
- Bakkafrost.

16.3.4.3 Additionally, vessel operators which were identified to navigate regularly within the Shipping and Navigation Study Area presented in **Figure 16-1: Overview of the Offshore Development Area of Search and Shipping and Navigation Study Area, Volume 2b** were contacted to provide opportunity for their input into the NRA process and attendance at the Hazard Workshop (including Bakkafrost). Full details of consultation with regular operators is provided in Appendix D within **Appendix 16.1, Volume 2c**.

16.3.4.4 Other shipping and navigation stakeholders contacted during the EIAR process include the Cruising Association, RYA Scotland, Scottish White Fish Producers Association, Scottish Pelagic Fishermen's Association, Royal National Lifeboat Institution (RNLI), Western Isles Council, and Stornoway/*Steòrnabhagh* Port.

16.3.4.5 A summary of this post scoping consultation is detailed in **Table 16-3**.

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Table 16-3 Summary of post scoping consultation

Consultee	Date / Document	Comment	Response/where this is addressed in the EIAR
MCA	4 November 2024, Post-Scoping Meeting	Noted that cables will be expected to be protected with the main issue being the risk of fishing gear snagging. Different protection types will have different levels of risk.	Worst-case for fishing gear snagging risk is assumed within Section 16.9. It is acknowledged that cables may be surface laid, buried or protected with the appropriate approach determined by a CBRA undertaken post consent.
		Noted that for aviation lighting there are statutory requirements for SAR purposes.	Lighting and marking requirements are included in Section 16.7.2 as an embedded mitigation measure and detailed further in **Outline Lighting and Marking Plan, Volume 3**.
NLB	4 November 2024, Post-Scoping Meeting	Noted that Loch Roag/*Loch Ròg* is at capacity and resource availability will be limited if it is being considered as a base location.	This is considered within Sections 16.8, 16.9, and 16.10.
		Confirmed that adjustments to lighting have been made for projects nearshore previously (e.g. Aberdeen Bay) to reduce light range of land-facing turbines but insight of traffic patterns would be needed to inform any adjustments of the LMP, especially analysis of the timing of transits.	Timings of inshore transits are considered within Section 10 within **Appendix 16.1, Volume 2c**.
		Noted that there is unlikely a large impact from visual impediment of the Aird Laimishader Lighthouse as it is only used for entry into Loch Roag/*Loch Ròg*. It is owned by Western Isles Council who can liaise with NLB if they feel there is an issue.	This is considered in Sections 16.8, 16.9, and 16.10.
		Noted an outline LMP would be well received.	**Outline Lighting and Marking Plan, Volume 3** has been submitted as part of the application.

Consultee	Date / Document	Comment	Response/where this is addressed in the EIAR
UK Chamber of Shipping	7 November 2024, Post-Scoping Meeting	Request to be provided the list of Regular Operators.	The list and letter were provided on 10 February 2025, the latter of which is included in Appendix D within **Appendix 16.1, Volume 2c**.
		Commented that the main concerns regard the DWR used by tankers to the northwest of the Array Area, as well as displacement of near-shore traffic.	**Appendix 16.1, Volume 2c** captures the DWR and the vessels transiting through it (see Sections 7 and 10). This is also captured in Section 16.6.1.
Bakkafrost	22 January 2025, Regular Operator Outreach	Bakkafrost have 5 salmon farms in Loch Roag/*Loch Ròg*, with well boats transiting to and from Stornoway/*Steòrnabhagh*.	This is considered within Sections 16.8, 16.9, and 16.10.
Inverlussa	27 January 2025, Regular Operator Outreach	Noted that if transiting through the Offshore Cable Area of Search (OCAS) is permitted during construction and operation phases, there is no reason operations would be impacted.	This is considered within Sections 16.8, 16.9, and 16.10.
		Inverlussa mainly transit the west coast of the Isle of Lewis/*Eilean Leòdhais* to access aquaculture sites in Loch Roag/*Loch Ròg*.	Use of Loch Roag/*Loch Ròg* by aquaculture vessels is considered within Sections 16.8, 16.9, and 16.10.
		Noted it was unlikely that Inverlussa vessels will choose to pass through the array but very likely to route through the OCAS.	This is considered within Sections 16.8, 16.9, and 16.10.
Navigare Logistics	28 January 2025, Regular Operators Outreach	Navigare Logistics are engaged in delivering fish food to Bakkafrost fish farms in Loch Roag/*Loch Ròg*.	Use of Loch Roag/*Loch Ròg* by aquaculture vessels is considered within Sections 16.8, 16.9, and 16.10.
		Noted that the Offshore Project will most likely not impact routeing, passage planning, or pose any safety concerns. Noted no reason for their	This is considered within Sections 16.8, 16.9, and 16.10.

Consultee	Date / Document	Comment	Response/where this is addressed in the EIAR
		vessels to make passage internally through the array.	
Bakkafrost	25 February 2025, Hazard Workshop	Noted importance of access to Loch Roag/*Loch Ròg* especially in adverse weather. Offshore Project vessels using the same pier facilities as Bakkafrost would impact operations.	Reduced access to facilities is considered within Sections 16.8, 16.9, and 16.10.
		Bakkafrost may increase use of Loch Roag/*Loch Ròg* including expansion of activities within the loch, this will not create new routeing patterns but would increase traffic volumes.	Vessel traffic increases are considered within Sections 16.8, 16.9, and 16.10, as well as quantitative modelling (see Section 16 within Appendix 16.1, Volume 2c).
		Confirmed that nearshore routes are not restricted by water depths, and exact routeing is determined by skipper preference. Though nearshore routes are not currently present following a factory closure in Stornoway/*Steòrnabhagh*, however, may occur depending on weather.	This is considered within Sections 16.8, 16.9, and 16.10.
		Encounters with other vessels do not typically occur on nearshore routes.	This is considered within Sections 16.8, 16.9, and 16.10.
		Confirmed a small deviation would be required for 1 route but is unlikely to cause an issue for approaches to Loch Roag/*Loch Ròg*, noting familiarity with transiting around islands and close to shore.	This is considered within Sections 16.8, 16.9, and 16.10.
NLB	25 February 2025, Hazard Workshop	IALA Guidance 1185 has recently been published and should be included.	This is considered in Section 16.2.

Consultee	Date / Document	Comment	Response/where this is addressed in the EIAR
		If Crew Transfer Vessels (CTVs) are to be used in Loch Roag/*Loch Ròg* then a further risk assessment will be required including a review of Aids to Navigation (AtoNs). This can be undertaken post consent if required.	This is considered as secondary mitigation in Sections 16.8, 16.9, and 16.10.
		Green Energy Project in Loch Roag/*Loch Ròg* and Spaceport at North Uist should be investigated for cumulative screening.	**Appendix 16.1, Volume 2c** considers these within the cumulative screening in Section 14.
		Wreck response should be considered within the NRA.	As per **Section 16.7.2**, there will be full MGN 654 compliance including in relation to the completion of an ERCoP post consent, which will include consideration of wreck response.
		Noted recent preference at Invergordon for use of semi-submersible vessels for long distance moves rather than relying on towage for rigs. Moves by towage remain the preference in the North Sea.	This is considered **within Section 16.9.**
UK Chamber of Shipping	25 February 2025, Hazard Workshop	The *Transocean Winner* grounding incident should be considered.	This incident is considered within Section 9 within **Appendix 16.1, Volume 2c** and Section 16.9.
		The NRA should be explicit in the reasoning behind an internal substation being considered as worst-case.	Explanation is included within Section 6 within **Appendix 16.1, Volume 2c**.
Company Fisheries Liaison Officer (CFLO)	25 February 2025, Hazard Workshop	A small number of potting vessels are active within the Shipping and Navigation Study Area and operate out of Carloway Pier between April – September.	This is considered within Section 16.9.
RYA Scotland		Loch Roag/*Loch Ròg* is an important location as a refuge for recreational vessels in case of adverse	This is acknowledged in Section 16.6.1 and considered within Sections 16.8, 16.9, and 16.10.

Consultee	Date / Document	Comment	Response/where this is addressed in the EIAR
	8 May 2025, Hazard Workshop materials response	weather with a lot of places that can be used as anchorages.	
		Discussions with the organisers of the Round Britain and Ireland yacht race may lead to the Array Area being able to serve as a mark of the course which vessels are required to pass outside.	This is considered within Section 16.8.
		Loss of AtoNs marking the Array Area are not an infrequent occurrence on the Scottish east coast and waters around the west coast of Lewis/*Eilean Leòdhais* can be wild making repair works a greater issue.	This is considered within Sections 16.9 and 16.11.
NLB	6 August 2025, Outline LMP meeting	NLB have agreed that shore-facing SPS lights may use a range of 2 nm rather than the nominal range of 5 nm and this will not adversely impact upon the safety of navigation.	This is acknowledged in **Outline Lighting and Marking Plan, Volume 3**.

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16.4 SCOPE OF THE ASSESSMENT

16.4.1 OVERVIEW

16.4.1.1 This section sets out the scope of the EIA assessment for Shipping and Navigation. This scope has been developed as the Offshore Project design has evolved and responds to feedback received to date as set out in Section 16.3.

16.4.2 SPATIAL SCOPE AND STUDY AREA

16.4.2.1 The spatial scope of the Shipping and Navigation assessment is defined as a minimum of a 10 nm buffer around the Array Area that has formed the basis of the Shipping and Navigation Study Area described in this Section. The Study Area used for the Shipping and Navigation assessment is consistent with the Scoping Report (Spiorad na Mara Limited, 2023), which is considered industry standard and sufficient for assessing vessel traffic activity within and in proximity to all aspects of the Offshore Project and has been agreed with Shipping and Navigation stakeholders. The Shipping and Navigation Study Area defined is presented in **Figure 16-1, Volume 2b**. It should be noted that the Shipping and Navigation Study Area captures the Array Area and the OCAS. A 50 nm buffer has been applied for the approach to cumulative screening for the Shipping and Navigation Cumulative Effects Assessment (CEA), as set out in Section 16.5.2.

16.4.3 TEMPORAL SCOPE

16.4.3.1 The temporal scope of the Shipping and Navigation assessment is the entire lifetime of the Offshore Project, which therefore covers the construction, O&M, and decommissioning phases. The offshore construction phase is anticipated to commence in 2028/2029 and last for a period of approximately 5 years. The O&M phase is expected to last for a minimum of 35 years. It is anticipated that the decommissioning phase will consist of the reverse of the construction phase, including a similar duration.

16.4.4 POTENTIAL RECEPTORS

16.4.4.1 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of the Offshore Project. The receptors identified that may experience likely significant effects for Shipping and Navigation are outlined in **Table 16-4**.

Table 16-4 Receptors requiring assessment for Shipping and Navigation

Receptor Group	Receptors included within Group
Commercial vessels	Cargo vessels, tankers, passenger vessels, fish farm support vessels., and other offshore support vessels undertaking commercial operations.
Commercial fishing vessels	Commercial fishing vessels in transit.
Recreational vessels	Non-commercial marine users including non-commercial vessels with 2.4-24 metres (m) length.
Military vessels	Military vessels in transit.
Port related services	Vessels associated with local ports and harbours.
Emergency responders	RNLI lifeboats, SAR helicopters on behalf of the MCA and marine pollution responders.

16.4.5 ACTIVITIES OR IMPACTS SCOPED INTO ASSESSMENT

16.4.5.1 Potential impact on Shipping and Navigation receptors that have been scoped in for assessment are summarised in **Table 16-5**.

Table 16-5 Activities or impacts scoped into the assessment for Shipping and Navigation

Receptor	Activity or Impact	Potential Effect
Construction and Decommissioning		
All vessels	Vessel displacement.	Construction/decommissioning activities associated with the installation/removal of structures and cables may displace existing routes/activity.
All vessels	Increased third-party vessel to third-party vessel collision risk.	Vessel displacement as a result of construction/decommissioning activities associated with the Offshore Project may increase encounters and collision risk between third-party vessels operating in the area.
All vessels	Third-party to Offshore Project vessel collision risk.	Offshore Project vessels associated with construction/decommissioning activities may increase encounters and collision risk for third-party vessels already operating in the area.
All vessels	Reduced access to local ports, harbours, and facilities.	Construction/decommissioning activities associated with the Offshore Project may increase the risk of reduced access to local harbours.
Operation and Maintenance		
All vessels	Vessel displacement.	The presence of surface structures within the Turbine Area and maintenance activities associated with subsea cables may displace existing routes/activity.
All vessels	Increased third-party vessel to third-party vessel collision risk.	Vessel displacement as a result of surface structures within the Turbine Area may increase encounters and

Receptor	Activity or Impact	Potential Effect
		collision risk between third-party vessels operating in the area.
All vessels	Third-party to Offshore Project vessel collision risk.	Offshore Project vessels associated with O&M activities may increase encounters and collision risk for third-party vessels already operating in the area.
All vessels	Reduced access to local ports, harbours, and facilities.	O&M activities associated with the Offshore Project may increase the risk of reduced access to local harbours.
All vessels	Vessel to structure allision risk.	Presence of structures within the Turbine Area will lead to creation of powered, drifting and internal allision risk for vessels, which may be exacerbated by loss of navigational aids such as lights and AIS signals due to storm damage and difficulty in repairing them timeously.
All vessels	Reduction in under keel clearance.	The presence of protection over subsea cables may reduce charted water depths leading to increased risk of under keel interaction for passing vessels.
All vessels	Vessel interaction with subsea cables.	The presence of protection over subsea cables may reduce charted water depths leading to increased risk of under keel interaction for passing vessels.
All vessels	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.

16.4.6 ACTIVITIES OR IMPACTS SCOPED OUT OF ASSESSMENT

16.4.6.1 A potential impact pathway has been scoped out from further assessment, resulting from a conclusion of no likely significant effect. This conclusion has been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. This scoped out impact pathway is considered in **Table 16-6**.

Table 16-6 Activities or impacts scoped out of assessment for Shipping and Navigation

Activity or Impact	Rationale for Scoping Out
Interference with communications and position fixing equipment.	A technical assessment has been undertaken in Section 13 within **Appendix 16.1, Volume 2c** and concluded that all topics associated with this impact are Broadly Acceptable and As Low As Reasonably Practicable (ALARP). Therefore, it is not considered necessary to provide further assessment in this chapter.

16.5 METHODOLOGY FOR BASELINE DATA GATHERING AND IMPACT ASSESSMENT

16.5.1 METHODOLOGY FOR BASELINE DATA GATHERING

Overview

16.5.1.1 Baseline data collection has been undertaken to obtain information over the Shipping and Navigation Study Area described in Section 16.4.2. The current baseline conditions presented in Section 16.6 sets out data currently available from the Shipping and Navigation Study Area.

Desk study

16.5.1.2 The data sources that have been collected and used to inform this Shipping and Navigation assessment are summarised in **Table 16-7**.

Table 16-7 Data sources used to inform the Shipping and Navigation

Source	Date	Summary	Coverage of Study Area
Anatec	2025	ShipRoutes database	Full coverage of Shipping and Navigation Study Area and the wider Scottish west coast.
Anatec	2023-2024	12 Months of AIS data	Full coverage of Shipping and Navigation Study Area between 1 July 2023 and 30 June 2024.
Scottish Government	2024	Vessel Monitoring System (VMS) data	Full coverage of Shipping and Navigation Study Area and the wider Scottish west coast.
United Kingdom Hydrographic Office (UKHO)	2023	Admiralty Sailing Directions North-West Coast of Scotland Pilot NP66B	Full coverage of Shipping and Navigation Study Area and the wider Scottish west coast.
UKHO	2023-2025	Admiralty Charts 2721, 2720, 2515	Full coverage of Shipping and Navigation Study Area and the wider Scottish west coast.
RYA	2019	RYA Coastal Atlas of Recreational Boating	Full coverage of Shipping and Navigation Study Area.
Clyde Cruising Club (CCC)	2024	Sailing Directions and Anchorages Outer Hebrides	Full coverage of Shipping and Navigation Study Area.
Department for Transport (DfT)	2015-2024	Helicopter tasking data	Full coverage of Shipping and Navigation Study Area.
RNLI	2014-2023	Data for marine incidents responded to by RNLI	Full coverage of Shipping and Navigation Study Area.
MAIB	2004-2023	Data for marine incidents data reported to the MAIB	Full coverage of Shipping and Navigation Study Area.

Site Surveys

16.5.1.3 As per the methodology within the associated guidance requirements of MGN 654 (MCA, 2021), 28 days of vessel traffic data has been collected for the Array Area. This has been collated from a vessel-based survey undertaken in summer 2023, and 2 shore-based surveys undertaken in winter 2024 and summer 2024.

16.5.1.4 The vessel-based survey ran from 18 July-14 August 2023 and culminated in an effective total of 13.8 days of AIS, Radio detection and ranging (Radar), and visual observation vessel traffic data. The survey was carried out from the multi-purpose vessel *Boulder* during a geotechnical survey of the Array Area, which left site occasionally due to adverse weather conditions, crew changes, and/or repairs. Given the non-comprehensive coverage provided by this vessel-based survey, it is considered as a secondary data source for validation of the vessel traffic movements in proximity to the Offshore Project.

16.5.1.5 The shore-based surveys were undertaken from a location within the village of Brue/*Brù*, on the west coast of the Isle of Lewis/*Eilean Leòdhais*, approximately 4.7 nm southeast of the Array Area during winter 2024 (21 February-6 March 2024) and summer 2024 (18 June-2 July 2024). Each survey spanned an effective period of 14 days, giving an effective total of 28 days of AIS, Radar, and visual observation vessel traffic data. This dataset is fully compliant with MGN 654 and is considered the primary data source for characterising vessel traffic movements in proximity to the Offshore Project.

16.5.1.6 Full details of the methodology adopted for the vessel traffic surveys are provided in **Appendix 16.1, Volume 2c**. The findings of the surveys have also been validated against analysis of 12 months of AIS data (1 July 2023-30 June 2024) to ensure comprehensive understanding of seasonal vessel movements and rig moves within the Shipping and Navigation Study Area.

16.5.1.7 The surveys that have been collected and used to inform this Shipping and Navigation assessment are summarised in **Table 16-8**.

Table 16-8 Site surveys undertaken for Shipping and Navigation

Survey Type	Scope of Survey	Coverage of Study Area
Vessel traffic data collection for summer 2023	13.8 days of AIS, Radar, and visual observation vessel traffic data collected between 18 July-14 August 2023.	Full coverage of Shipping and Navigation Study Area.
Vessel traffic data collection for winter 2024	14 days of AIS, Radar, and visual observation vessel traffic data collected between 21 February-6 March 2024. As per the methodology outlined in MGN 654 (MCA, 2021).	
Vessel traffic data collection for summer 2024	14 days of AIS, Radar, and visual observation vessel traffic data collected between 18 June-2 July 2024. As per the methodology outlined in MGN 654 (MCA, 2021).	

16.5.2 DATA LIMITATIONS AND ASSUMPTIONS

16.5.2.1 This section discusses key data gaps and limitations associated with the data sources used to inform the assessment of this chapter. These data limitations do not compromise the integrity of the assessment undertaken in this chapter due to the variety of sources that have been consulted and considered.

Vessel Traffic Data

16.5.2.2 It has been assumed that vessels under an obligation to broadcast information via AIS have done so, both in the vessel traffic surveys and long-term vessel traffic data. It has also been assumed that the details broadcast via AIS (such as vessel type and dimensions) are accurate unless clear evidence to the contrary was identified during Anatec's thorough quality assurance of the data. Additionally, the collection of Radar data during the vessel traffic surveys captures smaller vessels that may not broadcast on AIS.

Maritime Incidents

16.5.2.3 Although all UK commercial vessels are required to report accidents to the MAIB, this is not mandatory for non-UK vessels unless they are in a UK port, within 12 nm territorial waters or carrying passengers to a UK port. There are also no requirements for non-commercial recreational craft to report accidents to the MAIB. Therefore, it is possible that not every incident that occurred within the Shipping and Navigation Study Area will be recorded within the MAIB dataset (noting that the Shipping and Navigation Study Area does extend beyond 12 nm territorial waters).

16.5.2.4 The RNLI incident data cannot be considered comprehensive of all incidents in the Shipping and Navigation Study Area . Any incident to which an RNLI resource was not mobilised has not been accounted for in this dataset.

16.5.2.5 To minimise potential data gaps, historical incident data was discussed with stakeholders during the Hazard Workshop including the grounding incident of *Transocean Winner,* which was not included in the dataset within the Shipping and Navigation Study Area .

UKHO

16.5.2.6 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. For AtoNs, only those charted and considered key to establishing the Shipping and Navigation baseline are shown.

16.5.2.7 During consultation, input has been sought from relevant stakeholders regarding the navigational features baseline. Navigational features are based upon the most recently available UKHO Admiralty Charts and Sailing Directions at the time of writing, alongside feedback from stakeholders.

16.5.3 METHODOLOGY FOR ENVIRONMENTAL IMPACT ASSESSMENT

Introduction

16.5.3.1 The project-wide generic approach to assessment is set out in **Chapter 5, Volume 1a**. The following sections provide the assessment methodology used to assess the potential impacts on Shipping and Navigation only.

16.5.3.2 Quantitative modelling was undertaken to support the assessment of potential collision and allision impacts on Shipping and Navigation. Full details of quantitative assessment is provided in **Appendix 16.1, Volume 2c**.

Assessment Methodology

16.5.3.3 The assessment methodology for Shipping and Navigation for the EIAR is consistent with that provided in the Scoping Report (Spiorad na Mara Limited, 2023) and was agreed with stakeholders during the Hazard Workshop detailed in Section 16.3.4.. The methodology for the approach to assessment of Shipping and Navigation is set out in full within Section 3 of **Appendix 16.1, Volume 2c** and summarised in this Section.

16.5.3.4 As required under the MCA Methodology (Annex 1 to MGN 654) (MCA, 2021), and in line with international marine risk assessment standards, the IMO FSA (IMO, 2018) approach has been applied for impact assessment. The FSA methodology is centred on risk control, and assesses each impact in terms of its frequency of occurrence (see **Table 16-9**) and severity of consequence (see **Table 16-10**) in order that its significance can be determined as 'broadly acceptable', 'tolerable with mitigation', or 'unacceptable' via a risk matrix as shown in **Table 16-11**. The tier levels described in **Table 16-10** are defined within *The UK National Contingency Plan for Responding to Marine Pollution Incidents* (HM Government, 2024).

Table 16-9 Frequency criteria for Shipping and Navigation

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

Table 16-10 Consequence criteria for Shipping and Navigation

Severity of Consequence	Definition
Major	More than 1 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.

Table 16-11 IMO FSA Risk Matrix for Shipping and Navigation

Consequence	Major	Tolerable with Mitigation	Tolerable with Mitigation	Unacceptable	Unacceptable	Unacceptable
	Serious	Broadly Acceptable	Tolerable with Mitigation	Tolerable with Mitigation	Unacceptable	Unacceptable
	Moderate	Broadly Acceptable	Broadly Acceptable	Tolerable with Mitigation	Tolerable with Mitigation	Unacceptable
	Minor	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable with Mitigation	Tolerable with Mitigation
	Negligible	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable with Mitigation
		Negligible	Extremely Unlikely	Remote	Reasonably Probable	Frequent
		Frequency				

16.5.3.5 For the purposes of this assessment, effects are only described as **tolerable with mitigation** or **broadly acceptable** where the effects are ALARP. Impacts (both adverse and beneficial)

determined to be **broadly acceptable** or **tolerable with mitigation** are not significant in EIA terms. **Unacceptable** impacts are not ALARP and require additional mitigation measures (secondary mitigation) implemented beyond those considered embedded to reduce the residual effect to within **tolerable with mitigation** or **broadly acceptable** parameters. A level of effect determined as being **unacceptable** is considered a 'significant' effect in EIA terms and not ALARP.

16.5.3.6 It is noted that the NRA in **Appendix 16.1, Volume 2c** uses FSA terminology as required under MGN 654 (MCA, 2021). Differences in terminology are detailed in **Table 16-12**. This chapter uses the EIA terminology.

Table 16-12 Summary of Differences in Terminology Between EIA and NRA for Shipping and Navigation

EIA Term	NRA Term	Definition
Impact	Hazard	A potential to threaten human life, health, property or the environment.
Secondary mitigation	Additional mitigation measures	A means of controlling a single element of an impact which is additional to the risk with the embedded mitigation in place (required to reduce the risk to not significant, or ALARP).
Effect	Risk	The combination of the frequency of occurrence and the severity of consequence of an impact which results in a statement of significance.
Receptor	User	Sufferer of the effect.

16.5.3.7 Although EIA terminology has been adopted throughout the assessment of effects, the assessment is undertaken within the framework of FSA methodology as described above.

Approach to Cumulative Effects

16.5.3.8 The CEA assesses the impact associated with the Offshore Project together with other relevant plans, projects, and activities. Cumulative effects are therefore the combined effect of the Offshore Project in combination with the effects from a number of different projects, on the same receptor or resource.

16.5.3.9 The approach to the CEA for Shipping and Navigation differs from the process outlined in **Chapter 5, Volume 1a.** With respect to Shipping and Navigation, a bespoke tiering system is applied within the CEA for the purposes of the assessment of worst-case vessel routeing. Each development is considered on a case-by-case basis in terms of data confidence and development parameters to determine the foundation for screening in or out of the CEA. Section 16.11 provides the assessment of cumulative effects, with the full CEA methodology applied for Shipping and Navigation detailed in full within **Appendix 16.1, Volume 2c**.

Transboundary Effects

16.5.3.10 Transboundary effects arise when impacts from a development within a European Economic Area (EEA) state's territory affects the environment of another EEA state(s).

16.5.3.11 Transboundary effects in terms of vessel routeing (including to international ports) are considered and have been assessed in Sections 16.8, 16.9, and 16.10 (for the Offshore Project in isolation) and Section 16.11 (on a cumulative basis). Individual transits may have the potential to be associated with vessels that are internationally owned or located; however, any such transits have been captured within the baseline assessment of vessel traffic noting that AIS carriage requirements are set by the IMO and apply across EEAs.

16.6 BASELINE CONDITIONS

16.6.1 CURRENT BASELINE

Navigational Features

16.6.1.1 This section presents the key navigational features identified in proximity to the Array Area, as shown in **Figure 16-2: Key Navigational Features, Volume 2b**.

Ports, Harbours, and Related Services

16.6.1.2 The most prominent harbour area is within Loch Roag/*Loch Ròg*, which is located generally south of the Array Area with the harbour limit located approximately 1.9 nm southeast of the Array Area at its closest point. The Admiralty Sailing Directions (UKHO, 2023) states "*Loch Roag is a statutory harbour area which includes all waters within the seaward limits*". Several small fishing and recreational harbours are located within West Loch Roag/*Loch Ròg* including at Bhaltos/*Valtos* and Miavaig/*Miabhaig*. Likewise, East Loch Roag/*Loch Ròg* includes Kirkibost/*Chirceaboist* and Carloway/*Càrlabhagh*, the latter of which is the closest to the Array Area at 4 nm. Carloway/*Càrlabhagh* Harbour is primarily used by local fishing vessels and small leisure craft. The Admiralty Sailing Directions (UKHO, 2023) note that "*…all vessels of more than 24 m registered length must advise the Harbour Authority of their intended arrival and destination within the loch*".

16.6.1.3 The closest commercial port is Stornoway/*Steòrnabhagh* Harbour, on the east coast of the Isle of Lewis/*Eilean Leòdhais*, which is described by the Admiralty Sailing Directions (UKHO, 2023) as "*…the most important in the Hebrides, serving a large fishing industry and providing the main terminal on the Isle of Lewis for the vehicular ferry from Ullapool*."

IMO Routeing Measures

16.6.1.4 An IMO DWR is positioned between the Isle of Lewis/*Eilean Leòdhais* and the Flannan Islands/*Na h-Eileanan Flannach* and runs from Cape Wrath/*Am Parbh* to Skerryvore/*An Sgeir Mhòr*. Its use is recommended for laden tankers of 10,000 Gross Tonnage (GT) or above, with available depths of 34 m or more. Use of this DWR is weather permitting but allows vessels to avoid transiting through the restricted waters of the Minches/*Mhaoil* to the east of the Isle of Lewis/*Eilean Leòdhais*. The DWR is approximately 1.9 nm from the Array Area at all points of its northern boundary (i.e., the DWR runs parallel with the Array Area).

Key Aids to Navigation

16.6.1.5 Several key AtoNs are located within Loch Roag/*Loch Ròg*, including Aird Laimishader lighthouse, which is located at the entrance to East Loch Roag/*Loch Ròg* approximately 3.1 nm south of the Array Area. Additionally, the Butt of Lewis/*Rubha Robhanais* lighthouse is located just outside the Shipping and Navigation Study Area, approximately 11.3 nm northeast of the Array Area.

16.6.1.6 Additionally, a Floating Light Detection and Ranging (FLiDAR) buoy associated with the Offshore Project lies within the centre of the Array Area. This is expected to be removed in Q1 2026 and therefore is not considered relevant during any phase of the Offshore Project.

Active Aquaculture Sites

16.6.1.7 Numerous aquaculture sites are located across Loch Roag/*Loch Ròg* and are described in the Admiralty Sailing Directions (UKHO, 2023) as "*the source of farmed organic salmon and organic mussels*", and that the "*area should be regarded as environmentally fragile*". Generally, active shellfish sites are located towards the south of Loch Roag/*Loch Ròg*, whilst active seawater finfish sites are situated further north (Scotland's Aquaculture, 2024).

Military Practice and Exercise Areas

16.6.1.8 To the west of the Array Area is a Ministry of Defence (MOD) Practice and Exercise Area (PEXA). This is a firing practice area (D701F) and is situated approximately 5 nm from the Array Area. There are no restrictions in place on the right to transit within the area as it is only operational when the area is considered to be clear of all shipping.

Subsea Cables and Pipelines

16.6.1.9 There are no offshore subsea cables or pipelines located within the Array Area or the OCAS. The closest subsea cables and pipelines are situated entirely within Loch Roag/*Loch Ròg*, including a water pipeline which connects the island of Eilean Kearstay/*Eilean Chearstaigh* to the Isle of Lewis/*Eilean Leòdhais* mainland and the island of Great Bernera/*Beàrnaraigh Mòr*. A subsea cable and pipeline also run across the entrance to Loch Ceann Hulavig.

Charted Anchorages

16.6.1.10 No charted anchorages are observed within the Array Area or OCAS. The closest charted anchorages are located within Loch Roag/*Loch Ròg*.

16.6.1.11 The Admiralty Sailing Directions (UKHO, 2023) characterise various accessible anchorages within Loch Roag/*Loch Ròg*. The majority are only suitable for small to medium vessels and coasters; however, shelter is afforded to certain larger vessels. The CCC Sailing Directions and Anchorages for the Outer Hebrides note that in terms of anchorages there are "*…many which can be discovered by an enterprising skipper and careful use of Chart 2515*" (CCC, 2024).

16.6.1.12 From RYA Scotland/*Alba's* Hazard Workshop materials response, Loch Roag/*Loch Ròg* also has various places to use as anchorage by recreational vessels seeking refuge in adverse weather.

Charted Wrecks or Obstructions

16.6.1.13 The closest charted wreck to the Array Area is located 1.5 nm to the northeast. No other charted wrecks were recorded within the Shipping and Navigation Study Area[1].

Vessel Traffic Data

16.6.1.14 This section presents analysis of the vessel traffic data collected during 2 site-specific surveys undertaken during winter 2024 (**Figure 16-3: 14-Days Vessel Traffic Survey Data by Vessel Type (Winter), Volume 2b**) and summer 2024 (**Figure 16-4: 14-Days Vessel Traffic Survey Data by Vessel Type (Summer) Volume 2b**), covering the Array Area and the Shipping and Navigation Study Area.

Winter 2024

16.6.1.15 **Figure 16-3, Volume 2b** presents the vessel traffic data recorded within the Shipping and Navigation Study Area during the 14-day winter period in 2024, colour coded by vessel type.

16.6.1.16 During the winter period, there was an average of 5-6 unique vessels per day recorded within the Shipping and Navigation Study Area, and an average of 1 per day recorded within the Array Area itself and the OCAS.

16.6.1.17 The main vessel types recorded within the Shipping and Navigation Study Area during winter were fish farm support vessels (51%), fishing vessels (31%), and tankers (8%). Fishing vessels were prominent in the centre of the Shipping and Navigation Study Area, whilst fish farm support vessels associated with the aquaculture sites were observed to transit close to the coast and within Loch Roag/*Loch Ròg*. Tankers could be seen transiting the DWR offshore of the Array Area.

16.6.1.18 Vessel lengths were available for 82% of recorded vessels during the winter period and were commonly below 40 m (42%). This is reflective of the small vessels recorded inshore within Loch Roag/*Loch Ròg*. The overall average vessel length was 75 m, with lengths ranging from 16 m for a recreational vessel to 288 m for a Liquefied Natural Gas (LNG) tanker.

16.6.1.19 Vessel draught information was only available for 46% of recorded vessels during the winter period and were primarily below 5 m (69%). Again, this reflects the prevalence of smaller vessels operating further inshore. The overall average vessel draught was 4.3 m, with draughts ranging from 2 m for a port tender to 14.1 m for a product tanker.

16.6.1.20 A total of 3 different vessels were deemed as at anchor within the Shipping and Navigation Study Area during the winter period. These were a fish carrier which was recorded at anchor east of Great Bernera/*Beàrnaraigh Mòr* between 22-29 February 2024, as well as within West Loch Roag/*Loch Ròg* on 21 February 2024, a port tender at anchor within Breasclete/*Brèascleit* Bay between 25-27

[1] It is noted not all wrecks are charted, although all those considered a danger to the safety of navigation (and therefore relevant to Shipping and Navigation) are charted.

February 2024, and a buoy-laying vessel in East Loch Roag/*Loch Ròg* on the 4 and 5 March 2024. No anchoring activity was recorded further offshore.

16.6.1.21 No regular Roll-on/Roll-off cargo (RoRo) or Roll-on/Roll-off passenger (RoPax) vessel routeing was identified within the Shipping and Navigation Study Area during the winter period.

Summer 2024

16.6.1.22 **Figure 16-4, Volume 2b** presents the vessel traffic data recorded within the Shipping and Navigation Study Area during the 14-day summer period, colour coded by vessel type.

16.6.1.23 During the summer period, there was an average of between 7-8 unique vessels per day recorded within the Shipping and Navigation Study Area, and an average of 1 per day recorded within the Array Area itself. Within the OCAS, 1 unique vessel was recorded every 1-2 days during the summer period.

16.6.1.24 The main vessel types recorded within the Shipping and Navigation Study Area during summer were fishing vessels (31%), cargo vessels (25%), fish farm support vessels (14%), and tankers (14%). Fishing vessels were prominent inshore within Loch Roag/*Loch Ròg*, whilst tankers and cargo vessels could be seen transiting the DWR offshore of the Array Area. Recreational and passenger vessels were recorded in higher prevalence during the summer period compared to the winter period and were primarily recorded within and in the approaches to Loch Roag/*Loch Ròg*. A cruise liner was recorded to anchor overnight in Breasclete/*Brèascleit* Bay.

16.6.1.25 Vessel lengths were available for 90% of recorded vessels during the summer period and were commonly below 40 m (50%) or above 160 m (32%). This is reflective of the small vessels recorded inshore as well as larger vessels utilising the DWR. The overall average vessel length was 99 m, with lengths ranging from 7 m for a law enforcement vessel to 299 m for several LNG tankers.

16.6.1.26 Vessel draught information was only available for 39% of recorded vessels during the summer period and were primarily above 8 m (36%) or below 5 m (34%). Again, this reflects the distribution of vessel size. The overall average vessel draught was 6.8 m, with draughts ranging from 1.5 m for a recreational vessel to 16.5 m for a crude oil tanker.

16.6.1.27 A total of 2 different vessels were deemed as at anchor within the Shipping and Navigation Study Area during the summer period. These were a cruise liner which was recorded at anchor in Breasclete Bay on 27 June 2024, and a law enforcement vessel recorded south of Little Bernera on 20 June 2024, as well as in a rocky inlet within West Loch Roag/*Loch Ròg* on 23 June 2024. Again, no anchoring activity was recorded further offshore.

16.6.1.28 No regular RoRo or RoPax vessel routeing was identified within the Shipping and Navigation Study Area during the summer period.

Historical Maritime Incidents

RNLI

16.6.1.29 The RNLI responded to 8 incidents within the Shipping and Navigation Study Area over the period between 2014-2023, equating to an average of 1 incident every 1-2 years. The majority of incidents occurred close to the coast, with 1 located within the OCAS and none located within the Array Area. Of the 8 incidents 6 were not assigned an incident type. The remaining incidents were classed as 'Person in Danger' and 'Machinery Failure', the former located approximately 3.8 nm southeast of the Array Area and the latter 7.7 nm southwest.

16.6.1.30 Personal craft and fishing vessels were the most common casualty types for incidents responded to by the RNLI, with 2 instances each. Other casualty types include person in danger, cargo vessels, and powered recreational vessels.

16.6.1.31 No false alarms were reported by the RNLI within the Shipping and Navigation Study Area during the 10-year period.

MAIB

16.6.1.32 The MAIB reported 14 incidents[2] within the Shipping and Navigation Study Area during the 10-year period between 2014 and 2023, equating to an average of between 1-2 incident per year. The majority of these incidents were reported to be located close to the coast and within Loch Roag/*Loch Ròg*. None were recorded within the OCAS or the Array Area. Of the 14 reported incidents, 6 were classed as 'Machinery Failure' (43%), 5 were noted as 'Accident to Person' (36%). The remaining incidents were 'Fire/Explosion' and 'Grounding/stranding'.

16.6.1.33 From a review of MAIB data for the previous 10-year period between 2004-2013, 14 incidents were reported by the MAIB within the Shipping and Navigation Study Area, equating to between 1-2 incidents per year. Again, no incidents were reported within the Array Area nor the OCAS. 'Machinery Failure' was again the most common incident type, attributed to 5 incidents (38%), followed by 'Person Overboard' and 'Hazardous Incident', both of which were attributed to 2 incidents each (14%). Other recorded incident types include 'Accident to Person', 'Capsizing/Listing', 'Fire/Explosion', 'Flooding/Foundering', and 'Pollution'.

16.6.1.34 A notable incident within the Shipping and Navigation Study Area occurred during August 2016 when the semi-submersible rig *Transocean Winner* grounded at Dalmore/*Dail Mhor* Bay, which is located south of the Array Area and 3.4 nm southeast of the Array Area at its closest point. This resulted in damage to the towage equipment and rig pontoons.

[2] This total includes the *Transocean Winner* grounding incident which is not within the MAIB dataset for the Shipping and Navigation Study Area; however, the semi-submersible rig grounded at Dalmore Bay 3.4 nm southeast of the Array Area. More detail can be found in **Appendix 16.1, Volume 2c**.

DfT

16.6.1.35 There were 44 SAR helicopter taskings recorded within the Shipping and Navigation Study Area between April 2015-March 2024. Rescue/recovery taskings accounted for almost half, at 48%. This was followed by search only taskings at 34% as well as support taskings at 18%. All but 1 tasking was responded to by the Stornoway/*Steòrnabhagh* base. The remaining was a support tasking responded to by Prestwick, noting that 2 helicopters were tasked to 1 incident. No SAR tasking took place within the Array Area nor the OCAS.

16.6.2 FUTURE BASELINE

16.6.2.1 There is uncertainty associated with long-term predictions of vessel traffic growth including the potential for any other new developments in the UK or transboundary ports. Therefore, 2 independent scenarios of potential growth in commercial vessel movements of 10% and 20% have been estimated throughout the lifetime of the Offshore Project. These scenarios have been included in the quantitative modelling undertaken in the NRA within **Appendix 16.1, Volume 2c**.

16.6.2.2 Similarly, a conservative potential growth in fish farm support vessels of 10% and 20% have also been assumed. This is on the basis that there may be an increase in aquaculture sites on the west coast of the Isle of Lewis/*Eilean Leòdhais* in the future (see **Table 16-3**). This is a conservative assumption noting that inshore fish farm support vessel main routes presented in **Appendix 16.1, Volume 2c** are not currently active due to a factory closure in Stornoway/*Steòrnabhagh* (see **Table 16-3**).

16.6.2.3 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. There are no known major developments which would increase commercial fishing or recreational vessel activity in the region. Therefore, in line with assumptions for commercial vessels, a conservative potential growth in commercial fishing vessel and recreational vessel movements of 10% and 20% has been estimated throughout the lifetime of the Offshore Project. Changes in commercial fishing activity are considered further in **Chapter 21, Volume 2a**.

16.6.2.4 It is possible that climate change and measures taken to slow the effects of climate change could have an effect on shipping and navigation receptors. However, given the temporal nature of climate change, any effects are expected to develop in the long-term (post operational life of the Offshore Project) rather than the short- or medium-term. Therefore, it is not possible to suitably consider the future baseline for shipping and navigation accounting fully for climate change.

16.7 BASIS FOR ENVIRONMENT IMPACT ASSESSMENT

16.7.1 MAXIMUM DESIGN SCENARIO

16.7.1.1 Assessing using a parameter-based design envelope approach means that the assessment considers a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the consent applications. The assessment of the maximum adverse scenario for each receptor establishes the maximum potential adverse impact and as a result impacts of greater adverse significance would not arise should any other development scenario (as described **in Chapter 3, Volume 1a**) to that assessed within this chapter be taken forward in the final scheme design.

16.7.1.2 The maximum parameters and assessment assumptions that have been identified to be relevant to Shipping and Navigation are outlined in **Table 16-13** and are in line with **Chapter 3: Project Description, Volume 1a**.

16.7.1.3 Although pre-construction surveys may involve some limited and temporary interactions with the marine environment, the potential impacts of any such activities fall well within the MDS parameters assessed for this chapter. The MDS includes activities such as WTG foundation drilling and grouting, and Offshore Cable installation which represent a conservative upper bound on seabed disturbance, and vessel presence. These MDS activities therefore encompass the environmental footprint of pre-construction survey methods, which are significantly lower in magnitude, duration, and spatial extent.

16.7.1.4 For this reason, the potential environmental interactions of pre-construction surveys are not separately assessed, as they are already inherently accommodated within the worst case assumptions underpinning the MDS for this topic.

16.7.1.5 The difference in timing between pre-construction surveys and construction activities does not affect the assessment because the MDS represents the maximum magnitude of change, independent of phasing or scheduling. The pre-construction surveys occur over a much shorter duration and at materially lower intensities than the MDS bounding activities, and therefore do not introduce any temporal additive effects beyond those already assessed.

Table 16-13 Maximum Design Scenario considered for impacts on Shipping and Navigation

Potential Hazard	Maximum Design Scenario	Justification
Construction		
Vessel displacement	**Offshore infrastructure** Full build out of Scenario 2, consisting of: - Up to 60 WTGs - Installation of up to x12 Array Cables to final WTG in string (within Array Area) and up to x12 Array Cables to Landfall (within OCAS) up to 189 nm (350 kilometres (km)) in length. **Construction working arrangements** - Buoyed construction area encompassing the maximum extent of the Turbine Area; - Presence of 500 m construction and 50 m pre commissioning safety zones; - Assume that all third-party vessels will choose not to navigate within the buoyed construction area based on experience at previously under construction offshore wind farms which are delineated with buoyage. **Vessel movements** - Up to 35 construction vessels on site simultaneously; - Up to 871 vessel movements (return trips) per year **Construction programme** - Duration is up to 5 years. - Working hours are expected to be 24 hours, 7 days a week. - Offshore construction within the Offshore Project Boundary will only be undertaken during the April-October period, except for offshore Landfall construction works located within the HDD Exit Pit Area.	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 vessel to vessel collision risk.
Increased vessel to vessel collision risk (third-party to third-party vessels)	The MDS used for this assessment is identical to the MDS for the Offshore Project construction phase '*Vessel displacement*' pathway above.	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.
Vessel to vessel collision (third-party vessel to Offshore Project vessel)	The MDS used for this assessment is identical to the MDS for the Offshore Project construction phase '*Vessel displacement*' pathway above.	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 vessel to vessel collision risk involving an third-party vessel and an Offshore Project vessel.
Reduced access to local ports, harbours, and facilities	The MDS used for this assessment is identical to the MDS for the Offshore Project construction phase '*Vessel displacement*' pathway above.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on reduced access to local ports and harbours.
Operation and maintenance		
Vessel displacement	**Offshore infrastructure** Full build out of Scenario 2, consisting of: **WTG** - Up to 60 WTGs - Minimum spacing 900 m between WTGs - WTG with up to 4 legged jacket foundations with sea surface dimensions of 35 m x 35 m **Array Cables** - Cable length: 12 Array Cables to Final WTG (within the Turbine Area) and 12 Array Cables to Landfall (within the OCAS) equating to a maximum cable length of 189 nm (350 km). - Surface lay cables installed with 100% of cables requiring protection. - Cable protection: will be achieved using rock berms, rock bags, concrete mattresses or other inert material and will have a maximum width of 3 m, height of 1.1 m.	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.

	Operational and maintenance working arrangements - Presence of 500 m safety zones during major maintenance; - Assume that commercial vessels will choose not to navigate within the Turbine Area. - Small craft (fishing vessels and recreational vessels may choose to navigate internally within the Turbine Area. **Vessel movements** - Up to 10 operational and maintenance vessels on site simultaneously; - Up to 32,034 vessel movements (return trips) total. **Operational and maintenance programme** - Duration is up to 35 years.	
Increased vessel to vessel collision risk (third-party to third-party vessels)	The MDS used for this assessment is identical to the MDS for the Offshore Project O&M phase *'Vessel displacement'* pathway above.	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.
Third-party vessel to Project vessel collision risk	The MDS used for this assessment is identical to the MDS for the Offshore Project O&M phase *'Vessel displacement'* pathway above.	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.
Reduced access to local ports, harbours, and facilities	The MDS used for this assessment is identical to the MDS for the Offshore Project O&M phase *'Vessel displacement'* pathway above.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on reduced access to local ports and harbours.
Increased vessel to structure allision risk	**Offshore infrastructure** Full build out of Scenario 1, consisting of: **WTG** - Up to 60 WTGs - Minimum spacing 900 m between WTGs - Blade clearance: 30 m (28.33 m AMSL) - WTG with up to 4 legged jacket foundations with sea surface dimensions of 35 m x 35 m **OSP** - Up to 1 OSP - Topside dimensions 70 m x 70 m **Operational and maintenance working arrangements** - Presence of 500 m safety zones during major maintenance; - Assume that commercial vessels will choose not to navigate within the Turbine Area. - Small craft (fishing vessels and recreational vessels may choose to navigate internally within the Turbine Area. **Operational and maintenance programme** - Duration is up to 35 years.	Largest possible extent of surface infrastructure, greatest number of surface structures and greatest duration resulting in the maximum spatial and temporal effect on vessel to structure allision risk.
Reduced under keel clearance due to cable protection	**Offshore infrastructure** Full build out of Scenario 2, relevant components consisting of: **Array Cables** - Cable length: 12 Array Cables to Final WTG (within the Turbine Area) and 12 Array Cables to Landfall (within the OCAS) equating to a maximum cable length of 189 nm (350 km). - Surface lay cables installed with 100% of cables requiring protection. - Cable protection: will be achieved using rock berms, rock bags, concrete mattresses or other inert material and will have a maximum width of 3 m, height of 1.1 m. **Operational and maintenance programme** - Duration is up to 35 years.	Largest possible extent of subsea infrastructure and greatest duration resulting in the maximum spatial and temporal effect on under keel clearance.

Anchor and/or fishing gear interaction with subsea cables	The MDS used for this assessment is identical to the MDS for the Offshore Project O&M phase '*Reduced under keel clearance due to cable protection*' pathway above.	Largest possible extent of subsea infrastructure and greatest duration resulting in the maximum spatial and temporal effect on anchor interaction with subsea cables.
Reduction of emergency response capability due to increased incident rates and/or reduced access for SAR responders	**Offshore infrastructure** Full build out of Scenario 1, consisting of: **WTG** - Up to 60 WTGs - Minimum spacing 900 m between WTGs - Blade clearance: 30 m (28.33 m AMSL)- - WTG with up to 4 legged jacket foundations with sea surface dimensions of 35 m x 35 m **OSP** - Up to 1 OSP - Topside dimensions 70 m x 70 m **Array Cables** - Cable length: 12 Array Cables to Final WTG (within the Turbine Area) and 12 Array Cables to Landfall (within the OCAS) equating to a maximum cable length of 189 nm (350 km). All other parameters as per the Offshore Project O&M phase '*Vessel displacement*' pathway above.	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.
Decommissioning		
Vessel displacement	**Offshore infrastructure** Full removal of Scenario 2, consisting of: - Up to 60 WTGs - 12 Array Cables to Final WTG (within the Turbine Area) and 12 Array Cables to Landfall (within the OCAS) equating to a maximum cable length of 189 nm (350 km). **Decommissioning working arrangements** - Buoyed decommissioning area encompassing the maximum extent of the Turbine Area; - Presence of 500 m decommissioning and 50 m pre decommissioning safety zones; - Assume that all third-party vessels will choose not to navigate within the buoyed decommissioning area based on experience at previously under construction offshore wind farms which are delineated with buoyage. **Vessel movements** - Up to 35 decommissioning vessels on site simultaneously; - Up to 871 vessel movements (return trips) per year **Decommissioning programme** - Duration is up to 5 years. - Working hours are expected to be 24 hours, 7 days a week.	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.
Increased vessel to vessel collision risk (third-party to third-party vessels)	The MDS used for this assessment is identical to the MDS for the Offshore Project decommissioning phase *'Vessel displacement'* pathway above.	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.
Vessel to vessel collision (third-party vessel to Offshore Project vessel)	The MDS used for this assessment is identical to the MDS for the Offshore Project decommissioning phase *'Vessel displacement'* pathway above.	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 vessel to vessel collision risk involving an third-party vessel and an Offshore Project vessel.
Reduced access to local ports, harbours, and facilities	The MDS used for this assessment is identical to the MDS for the Offshore Project decommissioning phase *'Vessel displacement'* pathway above.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities, and greatest duration resulting in the maximum spatial and temporal effect on reduced access to local ports and harbours.

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16.7.2 EMBEDDED MITIGATION MEASURES

16.7.2.1 As part of the Offshore Project design process, a number of embedded mitigation measures have been adopted to reduce the potential for effects on Shipping and Navigation and these have evolved over the development process as the EIA has progressed and in response to consultation.

16.7.2.2 The embedded mitigation measures also include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements. As there is a commitment to implementing the embedded mitigation measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Offshore Project and are set out in this EIAR.

16.7.2.3 **Table 16-14** sets out the relevant embedded mitigation measures within the design and how these effects are relevant to the Shipping and Navigation assessment.

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Table 16-14 Relevant Shipping and Navigation embedded mitigation measures

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Shipping and Navigation Assessment
M002	A Cable Installation Plan will be produced to confirm routeing, method of installation and aspects such as target depth of burial and need for/location of/type of external cable protection. This plan will also contain the outputs of a formal Cable Burial Risk Assessment (CBRA). Data from the project-specific geophysical surveys will be used to identify the preferred route, with the use of natural crevasses or channels within the bedrock proposed, where feasible, and areas of thicker Quaternary sediments identified (to maximise opportunities for cable burial).	Pre-construction, Construction	Secured in the Section 36 Consent and/or Marine Licence conditions. Details will be provided within the Cable Installation Plan.	Ensures risk associated with presence of subsea cables (including anchor interaction, fishing gear snagging and reduced under keel clearance) is minimised.
M010	Compliance with MGN 654 and its annexes including development and implementation of a SAR Checklist, ERCoP and guard vessels as required by risk assessment.	Pre-construction, Construction, O&M, Decommissioning	Secured in the Section 36 Consent and/or Marine Licence conditions. Details will be provided within the ERCOP.	MGN 654 sets out considerations when assessing the impact on navigational safety and emergency response caused by OREIs.
M011	The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts, and	Pre-construction, Construction	To be secured through a condition of the Section 36 consent and/or Marine Licence.	Appropriate marking on relevant nautical charts aids mariners when navigating in proximity to the Offshore Project.

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Shipping and Navigation Assessment
	information on structure positions and heights will be provided to the UKHO.			
M012	Timely and efficient distribution of Notices to Mariners (NtMs), Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances. Physical notices will be placed at marinas and harbours in the vicinity of the Offshore Project and final locations of installed infrastructure will be charted and distributed to recreational clubs.	Pre-construction, construction, and decommissioning	Secured in the Section 36 consent and/or Marine Licence via the requirement for notifications and promulgation of information and will be set out within the NSVMP.	Promulgation of information including Notices to Mariners and Kingfisher Bulletins gives advance warning to mariners which allows appropriate passage planning. Approach will be detailed in Navigational Safety and Vessel Management Plan (NSVMP).
M013	Surface piercing structures - application for safety zones of up to 500 m pre-commissioning.	Pre-construction, Construction	To be secured through a condition of the Section 36 consent and/or Marine Licence.	Safety zones will help protect Offshore Project vessels undertaking construction and major maintenance activity and help ensure third-party vessels awareness of activity is maximised. Approach will be detailed in NSVMP.

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Shipping and Navigation Assessment
M014	Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b). This will include a buoyed construction area.	Pre-construction, Construction, O&M	To be secured through a condition of the Section 36 consent and/or Marine Licence.	Lighting and marking of structures provides AtoNs to mariners operating in the vicinity of the Array Area. Approach will be detailed in Lighting and Marking Plan (LMP).
M015	Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972/1977) and the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974).	Pre-construction, Construction, O&M, Decommissioning	To be secured through a condition of the Section 36 consent and/or Marine Licence.	Compliance with international marine regulations aids collision avoidance and maximises safety at sea.
M016	Wind turbines blade clearance of at least 28.33 m above Mean High Water Springs (MHWS) (30 m above Mean Sea Level (MSL)).	Design, Pre-construction, O&M	To be secured through a condition of the Section 36 consent and/or Marine Licence.	There will be a minimum blade tip clearance of at least 28.33 m above MHWS to minimise allision risk.
M020	A Decommissioning Plan will be developed prior to the construction of the Project in compliance with legislative requirements and/or best practice standards and guidance and adhered to.	Decommissioning	Secured in the Section 36 Consent and/or Marine Licence via the condition for a Decommissioning Plan to be submitted to MD-LOT for	Reduce risk of adverse Shipping and Navigation effects on receptors.

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Shipping and Navigation Assessment
			approval and the Energy Act 2004	
M022	A Final NSVMP will be developed prior to commencement of construction (building on the **Outline NSVMP, Volume 3**) in compliance with legislative requirements and/or best practice standards and guidance and adhered to.	Pre-construction, Construction, O&M, Decommissioning	Secured in the Section 36 Consent and/or Marine Licence via the condition for an NSVMP to be submitted to MD-LOT for approval.	Ensures active and safe management of navigational activities to minimise risk of adverse Shipping and Navigation effects on receptors.
M024	Dedicated risk assessment post consent if a location within Loch Roag/*Loch Ròg* is planned to be used as a base port taking account of vessel traffic in Loch Roag/*Loch Ròg*, full details of planned Offshore Project vessels, their movements, and bases within Loch Roag/*Loch Ròg*, plus any impact on use of existing AtoNs within Loch Roag/*Loch Ròg*.	Pre-construction, Construction, O&M, Decommissioning	To be secured through a condition of the Section 36 consent and/or Marine Licence.	Is required by the NLB as per consultation input during the Hazard Workshop. Ensures disruption to third-party vessel movements and activities in Loch Roag/*Loch Ròg* are minimised and details of requirements will be determined in consultation with NLB post consent if Loch Roag/*Loch Ròg* is used as a base port.
M026	A Fisheries Mitigation, Monitoring and Communication Plan (FMMCP) (building on **FMMCP, Volume 3**) will be developed in compliance with legislative requirements and/or best practice	Pre-construction, Construction	Secured in the Section 36 Consent and/or Marine Licence via the condition for an FMMCP to be submitted to MD-LOT for approval.	Reduce risk of adverse Shipping and Navigation effects on fishing vessels and maximise awareness of the Offshore Project.

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Shipping and Navigation Assessment
	standards and guidance prior to the operation of the Project and adhered to.			
M029	A Marine Coordination Centre will be established to monitor all vessel activity (Project, fishing and other maritime vessels), issue Notices to Mariners, and serve as a contact point for all maritime stakeholders.	Pre-construction, Construction, Decommissioning	To be secured through a condition of the Section 36 consent and/or Marine Licence.	Coordination and communication of Offshore Project vessel movements minimises disruption to third-party receptors. Approach will be detailed in NSVMP. The NSVMP will detail navigational safety measures and details relating to the coordination of Offshore Project vessels including indicative transit routes.
M030	Suitable implementation and monitoring of subsea cable burial, scour protection and cable protection in line with MGN 654 (via burial, or external protection where adequate burial depth as identified via risk assessment is not feasible). Surveys will be coordinated with the fishing industry, and results will be shared to support collaborative engagement and minimise conflict.	Pre-construction, Construction, Decommissioning	To be secured through a condition of the Section 36 consent and/or Marine Licence.	Cable protection reduces under keel clearance and protects against vessel interaction. The Cable Plan (CaP) will confirm planning cable routing, burial, and any additional protection and will set out methods for post-installation cable monitoring.

ID	Environmental Measure Proposed	Project Phase Measure Introduced	How the Environmental Measures will be Secured	Relevance to Shipping and Navigation Assessment
M031	A Marine Pollution Contingency Plan (MPCP) will be developed prior to commencement of construction (building on **MPCP, Volume 3**) in compliance with legislative requirements and/or best practice standards and guidance and adhered to.	Pre-construction, Construction, O&M	Secured in the Section 36 Consent and/or Marine Licence via the condition for an MPCP to be submitted to MD-LOT for approval.	An MPCP will include emergency plans and mitigation for a range of potential marine pollution incidents and outline procedures to protect personnel working and to safeguard the marine environment.
M033	A LMP will be developed prior to commencement of construction (building on the **Outline LMP, Volume 3**) in compliance with legislative requirements and best practice standards and guidance and adhered to.	Pre-construction, Construction, O&M, Decommissioning	Secured in the Section 36 Consent and/or Marine Licence conditions via the condition for a LMP to be submitted to MD-LOT for approval.	Lighting and marking of structures provides AtoNs to mariners operating in the vicinity of the Array Area.
M039	Lighting and marking failures will be appropriately reported and rectified as soon as possible. Interim hazard warnings will be put in place.	Construction, O&M, and Decommissioning	To be secured through a condition of the Section 36 consent and/or Marine Licence.	Lighting and marking of structures provides AtoNs to mariners operating in the vicinity of the Array Area.

16.8 ASSESSMENT OF EFFECTS: CONSTRUCTION PHASE

16.8.1 VESSEL DISPLACEMENT

16.8.1.1 Construction activities associated with the installation of structures and cables may displace existing routes/activity.

Qualification and Quantification of Risk

16.8.1.2 The volume of vessel traffic passing within or in proximity to the Array Area has been established using vessel traffic data collected during dedicated surveys (28 days over winter and summer 2024) and from AIS coastal receivers (12 months, 2023-2024) as well as Anatec's ShipRoutes database (Anatec, 2025) (see Section 16.6). These datasets were interrogated to identify main routes using the principles set out in MGN 654 (MCA, 2021) (see Section 11 within **Appendix 16.1, Volume 2c**).

16.8.1.3 Although there will be no restrictions on entry into the buoyed construction area, other than through active safety zones, based on experience at previously under construction OWFs and consultation, it is anticipated that the majority of commercial vessels will choose not to navigate internally within the buoyed construction area and therefore some main route deviations will be required (noting this aligns with feedback provided at the Hazard Workshop, see Section 4 within **Appendix 16.1, Volume 2c**). Operators associated with the aquaculture industry (Bakkafrost, Inverlussa, and Navigare Logistics) responded to the regular operators outreach (see **Table 16-2**) stating that it would be unlikely that they would choose to make passage internally within the Array Area. On this basis, it is likely that the majority of commercial vessels will deviate around the buoyed construction area.

16.8.1.4 The full methodology for main route deviations is provided in Section 15.5 within **Appendix 16.1, Volume 2c**, with deviations established in line with MGN 654 (MCA, 2021). A deviation will be required for 2 of the 10 main routes identified within the Shipping and Navigation Study Area (see Section 11.2 within **Appendix 16.1, Volume 2c)**, with details as follows:

- Route 5 (between Stornoway/*Steòrnabhagh* and West Loch Roag/*Loch Ròg*) – 1 vessel per week, deviation of 0.02 nm (0.03%). Likely these vessels will pass further inshore to increase passing distance from the Array Area leading to a minor deviation;
- Route 7 (between Stornoway/*Steòrnabhagh* and East Loch Roag/*Loch Ròg*) – 1 vessel per week, route decrease of 0.03 nm (0.05%). Likely these vessels will pass further inshore to increase passing distance from the Array Area leading to a minor deviation.

16.8.1.5 However, based on feedback received during the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**), routes 5 and 7 are not currently in operation due to a factory closure at Stornoway/*Steòrnabhagh* (see **Table 16-3**), though it has been conservatively assumed during

the assessment that they remain present or will return in the future. Additionally, it was confirmed during the Hazard Workshop that any deviation required would be minimal (see **Table 16-3**).

16.8.1.6 RoRo vessels were recorded in the Shipping and Navigation Study Area; however, no regular routeing was observed, and all RoRo tracks passed offshore of the Array Area. No RoPax vessels were recorded within the Shipping and Navigation Study Area.

16.8.1.7 Based on experience at previously under construction OWFs, 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 other than through active safety zones. There is considered to be sufficient sea room outside of the Array Area for transits from such vessel to be accommodated. This includes for the Round Britain and Ireland yacht race which could interact with the buoyed construction area, although the works could serve as a mark for the course. Displacement of active commercial fishing is assessed separately in **Chapter 21, Volume 2a**.

16.8.1.8 Due to the proximity of the Array Area to the coast, and the potential for up to 12 Array Cables to Landfall landing ashore, there may be an increased risk of displacement within the OCAS for third-party vessels. However, any impact would be localised to the spatial area immediately around the Offshore Project vessel(s) undertaking installation activities; temporary in nature; and limited to between the months of April–October (inclusive). Additionally, it was confirmed during the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**) that vessels transiting on nearshore routes are not constrained by water depth (see **Table 16-3**).

16.8.1.9 The main consequence of vessel displacement if it occurs will be increased journey times and distances for affected third-party vessels, although given the nature of the deviations anticipated due to the buoyed construction area or cable installation activities, such consequences will be limited. Offshore Project vessels associated with installation works in the OCAS will comply with international and flag state regulations (including COLREGs (IMO, 1972/77)) outlined in M015 and third-party vessels will be able to passage plan in advance given the promulgation of information relating to the Offshore Project (M012) and relevant nautical charts (across both the Array Area and OCAS) (M011).

16.8.1.10 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;

- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b). This will include a buoyed construction area;
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M022: A final NSVMP will be developed prior to commencement of construction;
- M026: Development and adherence to a FMMCP;
- M029: Marine Coordination Centre established to monitor all vessel activity, issue Notices to Mariners, and serve as a contact point for all maritime stakeholders;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.8.1.11 The frequency of occurrence in relation to displacement of vessel traffic across all aspects of the Offshore Project is considered **Frequent**.

Severity of Consequence

16.8.1.12 The severity of consequence in relation to displacement of vessel traffic for all aspects of the Offshore Project is considered **Negligible** in terms of navigational safety.

Significance of Effect

16.8.1.13 Taking the frequency of occurrence as Frequent and the severity of consequence as Negligible, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation**, which is considered ALARP and **Not Significant** in EIA terms.

16.8.2 INCREASED THIRD-PARTY VESSEL TO THIRD-PARTY VESSEL COLLISION RISK

16.8.2.1 Vessel displacement as a result of construction activities associated with the Offshore Project may increase encounters and collision risk between third-party vessels operating in the area.

Qualification and Quantification of Effect

16.8.2.2 Based on the vessel traffic data collected, it was estimated that 2 of the 10 main commercial routes would deviate as a result of the construction of the Offshore Project. This could lead to increased vessel densities inshore of the Array Area, which could in turn lead to an increase in vessel to vessel encounters and therefore increased collision risk. Additionally, during the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**), it was indicated that expansion of aquaculture

activities within Loch Roag/*Loch Ròg* and the west coast of the Isle of Lewis/*Eilean Leòdhais* in general may increase the number of vessels utilising the main commercial routes (see **Table 16-3**) which may further increase the likelihood of vessel to vessel encounters and collision risk.

16.8.2.3 Based on the pre OWF modelling, as presented in Section 16.2 within **Appendix 16.1, Volume 2c**, the baseline collision risk levels within the Shipping and Navigation Study Area are low, with an estimated vessel to vessel collision frequency of 1 every 2,002 years. The low level of collision risk is due to the volume of traffic in the area relative to the available sea space.

16.8.2.4 Based on the post OWF scenario, as presented in Section 16.3 within **Appendix 16.1, Volume 2c**, the baseline collision frequency was estimated at 1 in 1,998 years, with the change associated with fish farm support vessels displaced from the Turbine Area towards the coast. This represents an increase of less than 1% and reflect the small-scale nature of the main commercial route deviations as well as the low volumes of traffic associated with them. When anticipating the potential for an increase in vessels associated with new aquaculture sites, up to a 20% increase in overall vessel numbers was also considered, with an estimated vessel to vessel collision frequency of 1 every 1,372 years. Overall, this is regarded as a low collision risk particularly considering that the 20% increase was conservatively applied to total vessel numbers rather than fish farm support vessels only.

16.8.2.5 Additionally, it was confirmed during the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**) that encounters do not usually occur on nearshore routes (see **Table 16-3**) (i.e., routes 5 and 7). This aligns with the results of the encounters assessment (see Section 16.2.1 within **Appendix 16.1, Volume 2c**) and the findings of the incident data assessment (see Section 16.6.1), which showed no recorded collisions in the Shipping and Navigation Study Area over the periods studied. Furthermore, it was confirmed that, due to a factory closure in Stornoway/*Steòrnabhagh*, the nearshore routes are not currently in operation (see **Table 16-3**) but are conservatively assumed as in operation for this assessment.

16.8.2.6 The promulgation of information relating to construction activities and charting of infrastructure outlined in measure M012 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 outlined in measure M014 will be agreed with the NLB. These navigational aids will further maximise mariner awareness when in proximity. Additionally, information for fishing vessels will be promulgated through ongoing liaison with fishing fleets via an appointed CFLO as part of the FMMCP outlined in M026.

16.8.2.7 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 (Rule 8), thus ensuring that the situation does not develop into a collision incident. This is supported by experience at previous under construction OWFs, where no collision incidents involving 2 third-party vessels have been reported.

16.8.2.8 Specifically for collision avoidance associated with the DWR, the PIANC guidance for collision avoidance indicates that there should be sufficient sea room for a vessel to complete a full round turn with diameter of 6 vessel lengths. Additionally, a 0.3 nm initial turning distance and a 500 m safety distance zone should be considered (PIANC, 2018). Conservatively using the maximum vessel length recorded across all of the vessel traffic datasets (336 m), the corresponding distance required for a full round turn is 1.66 nm. This is less than the actual distance between the DWR and the Array Area (1.9 nm). Furthermore, based on the Shipping Route Template (Annex 2 of MGN 654) (MCA, 2021) a distance of 1.9 nm from an IMO routeing measure is considered to be "*medium risk*" and "*tolerable if ALARP*". Given the volume of traffic utilising the DWR (average of 7 per week) and the compliance with the PIANC guidance for collision avoidance, the 1.9 nm distance is considered to be ALARP.

16.8.2.9 Historical collision incident data (see Section 9.6 within **Appendix 16.1, Volume 2c**) also indicates that the most likely consequences will be low 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, 1 or more of the vessels could be foundered resulting in a Potential Loss of Life (PLL) and pollution.

16.8.2.10 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b). This will include a buoyed construction area;
- M022: A final NSVMP will be developed prior to commencement of construction;
- M026: Development and adherence to a FMMCP;
- M031: A MPCP will be developed prior to commencement of construction;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.8.2.11 The frequency of occurrence in relation to increased third-party vessel to third-party vessel collision risk for all aspects of the Offshore Project is considered **Extremely Unlikely**.

Severity of Consequence

16.8.2.12 The severity of consequence in relation to increased third-party vessel to third-party vessel collision risk for all aspects of the Offshore Project is considered **Serious**.

Significance of Effect

16.8.2.13 Taking the frequency of occurrence as Extremely Unlikely and the severity of consequence as Serious, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.8.3 THIRD-PARTY VESSEL TO PROJECT VESSEL COLLISION RISK

16.8.3.1 Offshore Project vessels associated with construction activities may increase encounters and collision risk for third-party vessels already operating in the area.

Qualification of Effect

16.8.3.2 Up to 871 annual return trips by construction vessels may be made throughout the construction phase, noting this will include vessels which are restricted in their ability to manoeuvre (RAM). During the construction phase, Offshore Project vessels will be on site between April–October (inclusive).

16.8.3.3 Encounters and collision risk involving Offshore Project vessels will be managed by marine coordination including the application of traffic management procedures such as the designation of entry and exit points to/from the buoyed construction area and routes to and from construction ports. These measures will be set out in the NSVMP (M022) and will be particularly important should a construction port be located within Loch Roag/*Loch Ròg* where traffic density is greatest. From consultation feedback received during the Hazard Workshop, in such a scenario a dedicated risk assessment should be undertaken post consent taking account of vessel traffic in Loch Roag/*Loch Ròg* and full details of planned Offshore Project vessels, their movements and bases to ensure effects associated with interactions between third-party vessels and Offshore Project vessels are ALARP (M024).

16.8.3.4 Additionally, Offshore Project vessels will carry AIS and be compliant with Flag State regulations including IMO conventions such as the COLREGs outlined in measure M015, and information for fishing vessels will also be promulgated through ongoing liaison with fishing fleets via an appointed CFLO as part of the FMMCP (M026).

16.8.3.5 An application for safety zones of 500 m will be sought during the construction phase around structures where construction activity is ongoing outlined in measure M013 (i.e., where a

construction vessel is present). These will serve to protect Offshore Project vessels engaged in construction activities. Minimum advisory passing distances, as defined by risk assessment, may also be applied where safety zones do not apply (e.g., around cable installation vessels), with advanced warning and details of both safety zones and any minimum advisory safe passing distances provided by Notifications to Mariners and Kingfisher Bulletins (M012).

16.8.3.6 Appropriate marine lighting and marking during construction including the buoyed construction area will be agreed with the NLB and MCA outlined in measure M014. These navigational aids will further maximise mariner awareness when in proximity to ongoing construction works in the Array Area.

16.8.3.7 Third-party vessels may have reduced capabilities to visually identify Offshore Project vessels entering and exiting the Array Area during reduced visibility; however, this impact will be mitigated by the application of the COLREGs (Rule 19) (M015) in adverse weather conditions and Offshore Project vessels mandatorily will carry AIS regardless of size. The likelihood of a collision is likely to be greater in reduced visibility when the identification of Offshore Project vessels entering and exiting the Array Area 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.

16.8.3.8 Based on historical incident data since 2003, there has been 1 instance of a third-party vessel colliding with a OWF development Offshore Project vessel in the UK (see Section 9.6 within **Appendix 16.1, Volume 2c**). In this incident, moderate vessel damage was reported with no harm to persons. This occurred in 2011, and awareness of offshore wind developments and application of the industry standard measures has improved and been refined considerably in the interim, with no further collision incidents reported since.

16.8.3.9 Similar to third-party vessel to third-party vessel collision risk (see Section 16.8.2), if an encounter occurs between a third-party vessel and an Offshore 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 (Rule 8), the vessels involved will likely be able to resume their respective passages and/or activities with no long-term consequences.

16.8.3.10 Should a collision occur, the most likely consequences will be similar to that outlined for the case of a collision between 2 third-party vessels (see Section 16.8.2) 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. As an unlikely worst-case, 1 or more of the vessels could be foundered resulting in a PLL and pollution. If pollution were to occur in proximity to the Offshore Project Boundary or involving an Offshore Project vessel, then the MPCP will be implemented to minimise the environmental effects (M031).

16.8.3.11 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b). This will include a buoyed construction area;
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M022: A final NSVMP will be developed prior to commencement of construction;
- M024: Dedicated risk assessment post consent if a location within Loch Roag/*Loch Ròg* is planned to be used as a base port taking account of vessel traffic in Loch Roag/*Loch Ròg* and full details of planned Offshore Project vessels, their movements, and bases within Loch Roag/*Loch Ròg*.
- M026: Development and adherence to a FMMCP;
- M029: Marine Coordination Centre established to monitor all vessel activity, issue Notices to Mariners, and serve as a contact point for all maritime stakeholders;
- M031: A MPCP will be developed prior to commencement of construction;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.8.3.12 The frequency of occurrence in relation to third-party vessel to Offshore Project vessel collision risk for all aspects of the Offshore Project is considered **Remote**.

Severity of Consequence

16.8.3.13 The severity of consequence in relation to third-party vessel to Offshore Project vessel collision risk for all aspects of the Offshore Project is considered **Serious**.

Significance of Effect

16.8.3.14 Taking the frequency of occurrence as Remote and the severity of consequence as Serious, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.8.4 REDUCED ACCESS TO LOCAL PORTS, HARBOURS, AND FACILITIES

16.8.4.1 Construction activities associated with the Offshore Project may increase the risk of reduced access to local harbours.

Qualification of Effect

16.8.4.2 Up to 871 annual return trips by construction vessels may be made annually throughout the construction phase and will include vessels which are RAM.

16.8.4.3 The closest port or harbour area to the Array Area is Loch Roag/*Loch Ròg*, located approximately 1.9 nm south of the Array Area. Loch Roag/*Loch Ròg* itself contains various piers, harbours and jetties, the closest to the Array Area being Carloway/*Càrlabhagh* Pier which is situated at the entrance to East Loch Roag/*Loch Ròg*. Stornoway/*Steòrnabhagh* Port is situated approximately 15 nm (over land) southeast of the Array Area on the opposite coast of the Isle of Lewis/*Eilean Leòdhais*. It is noted that vessels would have to transit north of the Butt of Lewis/*Rubha Robhanais* prior to heading south to Stornoway/*Steòrnabhagh* (a journey of approximately 45 nm), thus it is not anticipated that construction activities of the Offshore Project would have an impact on access to Stornoway/*Steòrnabhagh* Port.

16.8.4.4 The closest port/harbour to the OCAS is also Loch Roag/*Loch Ròg*, located 5.2 nm to the southwest at its closest point. Based on the distance between the Offshore Project Boundary and the Loch Roag/*Loch Ròg* harbour limits, it is considered unlikely that there will be a large impact on access to Loch Roag/*Loch Ròg* due to the presence of the Offshore Project Boundary. This was supported by feedback at the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**) indicating that the manner by which vessels approach the entrance to Loch Roag/*Loch Ròg* is not expected to be impacted by the Offshore Project Boundary.

16.8.4.5 In addition to various harbour facilities, Loch Roag/*Loch Ròg* contains several aquaculture sites operated by Bakkafrost (see **Table 16-3**). 6 of the 10 main commercial routes are associated with aquaculture vessels servicing these sites within the loch. Base ports for the Offshore Project are not yet known. However, feedback received during stakeholder consultation including the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**) highlighted that Loch Roag/*Loch Ròg* is currently at capacity, and the use of Loch Roag/*Loch Ròg* as a base port during construction of the Offshore Project may reduce access to facilities which could impact on local aquaculture operations (see **Table 16-3**). There is also potential that the presence of Offshore Project vessels may restrict recreational vessels from accessing safe anchorage during adverse weather.

16.8.4.6 It was indicated during the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**) that many of the vessels utilising the area are familiar with transiting around islands and close to shore (see **Table 16-3**) and the majority of vessels recorded utilising the loch are of small size (see Section 16.6.1), which reduces the effect of reduced access. It was also confirmed during consultation that the Aird Laimishader Lighthouse at the entrance to East Loch Roag/*Loch Ròg* would likely be unimpacted by the Offshore Project, and will retain its ability as a key AtoN upon entrance to the loch (see **Table 16-3**).

16.8.4.7 The effect is further reduced by managing Offshore Project vessels by marine coordination (M029), including the use of traffic management procedures such as the designation of entry and exit points to and from the buoyed construction area, and designated routes to and from construction ports. These measures will be set out in the NSVMP (M022) and will be particularly important should a construction port be located within Loch Roag/*Loch Ròg* where traffic density is greatest. From consultation feedback received during the Hazard Workshop, in such a scenario a dedicated risk assessment should be undertaken post consent taking account of vessel traffic in Loch Roag/*Loch Ròg* and full details of planned Offshore Project vessels, their movements and bases to ensure effects associated with interactions between third-party vessels and Offshore Project vessels (which may affect port access) are ALARP (M024).

16.8.4.8 Offshore Project vessels will also carry AIS and be compliant with Flag State regulations including the COLREGs outlined in measure M015.

16.8.4.9 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M022: A final NSVMP will be developed prior to commencement of construction;
- M024: Dedicated risk assessment post consent if a location within Loch Roag/*Loch Ròg* is planned to be used as a base port taking account of vessel traffic in Loch Roag/*Loch Ròg*, full details of planned Offshore Project vessels, their movements, and bases within Loch Roag/*Loch Ròg*, plus any impact on use of existing AtoNs within Loch Roag/*Loch Ròg*.
- M026: Development and adherence to a FMMCP;
- M029: Marine Coordination Centre established to monitor all vessel activity, issue Notices to Mariners, and serve as a contact point for all maritime stakeholders;

Frequency of Occurrence

16.8.4.10 The frequency of occurrence in relation to reduced access to local ports, harbours, and facilities for all aspects of the Offshore Project is considered **Remote**.

Severity of Consequence

16.8.4.11 The severity of consequence in relation to reduced access to local ports, harbours, and facilities for all aspects of the Offshore Project is considered **Moderate**.

Significance of Effect

16.8.4.12 Taking the frequency of occurrence as Reasonably Probable and the severity of consequence as Moderate, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.9 ASSESSMENT OF EFFECTS: OPERATION AND MAINTENANCE

16.9.1 VESSEL DISPLACEMENT

16.9.1.1 The presence of surface structures within the Turbine Area and maintenance activities associated with subsea cables may displace existing routes/activity.

Qualification and Quantification of Effect

16.9.1.2 Though there will be no restrictions on entry into the Turbine Area during the operation and maintenance phase, other than through active safety zones during periods of major maintenance, based on experience at currently operational OWFs and consultation, it is anticipated that the majority of commercial vessels will choose not to navigate internally within the Turbine Area and therefore route deviations for the main commercial routes established for the equivalent construction phase impact in line with MGN 654 (MCA, 2021) are again considered (see Section 16.8.1).

16.9.1.3 It is again noted however, that routes 5 and 7 are not currently in operation, as per feedback received during the Hazard Workshop (see **Table 16-3**).

16.9.1.4 As per the equivalent construction phase, it is anticipated that fishing vessels and recreational vessels will generally choose not to routinely navigate internally within the Turbine Area; however, there is considered to be sufficient spacing between structures for internal navigation where individual mariners choose to do so. Additionally, 'wind farm tourism' may occur in the area, noting that recreational marine tours are already in operation out of Loch Roag/*Loch Ròg,* this is assessed separately within **Chapter 20: Other Sea Users, Volume 2a**. Displacement of active commercial fishing is assessed separately in **Chapter 21, Volume 2a**.

16.9.1.5 Given the available sea room and implementation of the NSVMP in **Outline Navigational Safety and Vessel Management Plan, Volume 3**, it is considered unlikely that cable maintenance activities will lead to any notable displacement or disruption, as any impact would be localised to the spatial area immediately around the Offshore Project vessel and would be temporary in nature. Additionally, it was confirmed during the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**) that vessels transiting on nearshore routes are not constrained by water depth (see **Table 16-3**).

16.9.1.6 As per the equivalent construction phase effect, the main consequence of vessel displacement if it occurs will be increased journey times and distances for affected third-party vessels but is anticipated to be limited. Offshore Project vessels associated with maintenance works in the OCAS will comply with international and flag state regulations (including COLREGs (IMO, 1972/77) (M015)) and third-party vessels will be able to passage plan in advance given the promulgation of information relating to the Offshore Project and relevant nautical charts (across both the Array Area and OCAS).

16.9.1.7 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b);
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M022: A final NSVMP will be developed prior to commencement of construction;
- M026: Development and adherence to a FMMCP;
- M029: Marine Coordination Centre established to monitor all vessel activity, issue Notices to Mariners, and serve as a contact point for all maritime stakeholders;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.9.1.8 The frequency of occurrence in relation to displacement of vessel traffic for all aspects of the Offshore Project is considered **Frequent**.

Severity of Consequence

16.9.1.9 The severity of consequence in relation to displacement of vessel traffic for all aspects of the Offshore Project is considered **Negligible** in terms of navigational safety.

Significance of Effect

16.9.1.10 Taking the frequency of occurrence as Frequent and the severity of consequence as Negligible, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.9.2 INCREASED THIRD-PARTY VESSEL TO THIRD-PARTY VESSEL COLLISION RISK

16.9.2.1 Vessel displacement as a result of surface structures within the Turbine Area may increase encounters and collision risk between third-party vessels operating in the area.

Qualification and Quantification of Effect

16.9.2.2 Given the main route deviations are anticipated to remain as per those established for the equivalent construction phase impact (see Section 16.8.2), the likelihood of an encounter occurring are also likely to be similar and potentially lower in the OCAS since displacement will be limited to when maintenance activity is ongoing. As discussed in Section 16.8.2, the baseline annual collision frequency for the post OWF scenario (1 in 1,998 years) represents a minor increase compared to the pre OWF base scenario. This relatively low level of estimated collision risk aligns well with the incident datasets assessed (see Section 16.6.1).

16.9.2.3 Similar to the equivalent construction phase effect, the promulgation of information relating to maintenance activities and charting of infrastructure outlined in measure M012 will allow vessel Masters to passage plan in advance, minimising any displacement and hence collision risk. Appropriate marine lighting and marking of the Turbine Area outlined in measure M014 will be agreed with the NLB and MCA. These navigational aids will further maximise mariner awareness when in proximity. Additionally, information for fishing vessels will be promulgated through ongoing liaison with fishing fleets via an appointed CFLO as part of the FMMCP (M026).

16.9.2.4 The minimum spacing between WTGs (900 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 Offshore Project Boundary.

16.9.2.5 As per the equivalent construction phase effect, the most likely consequences will be low 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, 1 or more of the vessels could be foundered resulting in a PLL and pollution.

16.9.2.6 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b);
- M022: A final NSVMP will be developed prior to commencement of construction;
- M026: Development and adherence to a FMMCP;
- M029: Marine Coordination Centre established to monitor all vessel activity, issue Notices to Mariners, and serve as a contact point for all maritime stakeholders;
- M031: A MPCP will be developed prior to commencement of construction;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.9.2.7 The frequency of occurrence in relation to increased third-party vessel to third-party vessel collision risk for all aspects of the Offshore Project is considered **Extremely Unlikely**.

Severity of Consequence

16.9.2.8 The severity of consequence in relation to increased third-party vessel to third-party vessel collision risk for all aspects of the Offshore Project is considered **Serious**.

Significance of Effect

16.9.2.9 Taking the frequency of occurrence as Extremely Unlikely and the severity of consequence as Serious, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.9.3 THIRD-PARTY VESSEL TO PROJECT VESSEL COLLISION RISK

16.9.3.1 Offshore Project vessels associated with operation and maintenance activities may increase encounters and collision risk for third-party vessels already operating in the area.

Qualification of Effect

16.9.3.2 Up to 32,034 return trips by operation and maintenance vessels may be made throughout the life of the Offshore Project, noting this may include RAM vessels. The total vessel movements during the operation and maintenance phase represents a decrease in movements compared to the construction phase.

16.9.3.3 Encounter and collision risk involving Offshore Project vessels during the operation and maintenance phase will be managed by marine coordination (M029) including the application of traffic management procedures such as the designation of entry and exit points to/from the Turbine Area and routes to and from base ports. These measures will be set out in the NSVMP (M022), again noting that from consultation, should a base port during the operation and maintenance phase be located within Loch Roag/*Loch Ròg* then a dedicated risk assessment should be undertaken post consent taking account of vessel traffic in Loch Roag/*Loch Ròg* and full details of planned Offshore Project vessels, their movements and bases (M024).

16.9.3.4 Additionally, Offshore Project vessels will carry AIS and be compliant with Flag State regulations including IMO conventions such as the COLREGs outlined in measure M015, and information for fishing vessels will also be promulgated through ongoing liaison with fishing fleets via an appointed CFLO as part of the FMMCP (M026).

16.9.3.5 An application for safety zones of 500 m will be sought during the operation and maintenance phase around structures where major maintenance activity is ongoing outlined in measure M013. These will serve to protect Offshore Project vessels engaged in maintenance activities. Minimum advisory passing distances, as defined by risk assessment, may also be applied where safety zones do not apply, with advanced warning and details of both safety zones and any minimum advisory safe passing distances provided by Notifications to Mariners and Kingfisher Bulletins outlined in measure M012.

16.9.3.6 Appropriate marine lighting and marking of the Turbine Area will be agreed with the NLB and MCA outlined in measure M014. These navigational aids will further maximise mariner awareness when in proximity to ongoing maintenance works in the Array Area.

16.9.3.7 Similar to the equivalent construction phase effect, third-party vessels may have reduced capabilities to visually identify Offshore Project vessels entering and exiting the Turbine Area during reduced visibility; however, this effect will be mitigated by the application of the COLREGs (Rule 19) in adverse weather conditions and Offshore Project vessels mandatorily will carry AIS regardless of size. The likelihood of a collision is likely to be greater in reduced visibility when the identification of Offshore Project vessels entering and exiting the Turbine Area 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 (M015).

16.9.3.8 Should a collision occur, the most likely consequences will be similar to that outlined for the case of a collision between 2 third-party vessels (see Section 16.9.2), 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. As an unlikely worst-case, 1 or more of the vessels could be foundered resulting in a PLL and pollution. If pollution were to occur in proximity to the Offshore Project Boundary or involving an Offshore Project vessel, then the MPCP will be implemented to minimise the environmental effects, outlined in M031.

16.9.3.9 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b);
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M022: A final NSVMP will be developed prior to commencement of construction; and
- M024: Dedicated risk assessment post consent if a location within Loch Roag/*Loch Ròg* is planned to be used as a base port taking account of vessel traffic in Loch Roag/*Loch Ròg* and full details of planned Offshore Project vessels, their movements, and bases within Loch Roag/*Loch Ròg*;
- M026: Development and adherence to a FMMCP;
- M029: Marine Coordination Centre established to monitor all vessel activity, issue Notices to Mariners, and serve as a contact point for all maritime stakeholders;
- M031: A MPCP will be developed prior to commencement of construction;
- M033: A LMP will be developed prior to commencement of construction;

- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.9.3.10 The frequency of occurrence in relation to third-party vessel to Offshore Project vessel collision risk for all aspects of the Offshore Project is considered **Extremely Unlikely**.

Severity of Consequence

16.9.3.11 The severity of consequence in relation to third-party vessel to Offshore Project vessel collision risk for all aspects of the Offshore Project is considered **Serious**.

Significance of Effect

16.9.3.12 Taking the frequency of occurrence as Remote and the severity of consequence as Serious, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.9.4 REDUCED ACCESS TO LOCAL PORTS, HARBOURS, AND FACILITIES

16.9.4.1 Operation and maintenance activities associated with the Offshore Project may increase the risk of reduced access to local harbours.

Qualification of Effect

16.9.4.2 Up to 32,034 return trips by operation and maintenance vessels may be made during the lifetime of the Offshore Project and may include vessels which are RAM.

16.9.4.3 Similar to the equivalent construction phase effect, it is not anticipated that operation and maintenance activities within the Offshore Project Boundary will have a substantial effect on vessel approaches to and from Loch Roag/*Loch Ròg*. It is not yet known which base ports will be used for the Offshore Project. However, feedback received during stakeholder consultation including the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**) highlighted that Loch Roag/*Loch Ròg* is currently at capacity, and the use of Loch Roag/*Loch Ròg* as a base port may reduce access to facilities which may impact on aquaculture operations (see **Table 16-3**) and restrict recreational vessels from accessing safe anchorage during adverse weather.

16.9.4.4 The effect is reduced by managing Offshore Project vessels by marine coordination (M012), including the use of traffic management procedures such as the designation of entry and exit points to and from the Turbine Area, and designated routes to and from operational ports. These measures will be set out in the NSVMP (M022) and will be particularly important should an operational port be located within Loch Roag/*Loch Ròg* where traffic density is greatest. From consultation, in such a scenario a dedicated risk assessment should be undertaken post consent taking account of vessel traffic in Loch Roag/*Loch Ròg* and full details of planned Offshore Project

vessels, their movements and bases to ensure effects associated with interactions between third-party vessels and Offshore Project vessels (which may affect port access) are ALARP (M024).

16.9.4.5 Offshore Project vessels will also carry AIS and be compliant with Flag State regulations including the COLREGs outlined in measure M015.

16.9.4.6 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b);
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M022: A final NSVMP will be developed prior to commencement of construction; and
- M024: Dedicated risk assessment post consent if a location within Loch Roag/*Loch Ròg* is planned to be used as a base port taking account of vessel traffic in Loch Roag/*Loch Ròg* and full details of planned Offshore Project vessels, their movements, and bases within Loch Roag/*Loch Ròg*, plus any impact on use of existing AtoNs within Loch Roag/*Loch Ròg*;
- M026: Development and adherence to a FMMCP;
- M029: Marine Coordination Centre established to monitor all vessel activity, issue Notices to Mariners, and serve as a contact point for all maritime stakeholders;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.9.4.7 The frequency of occurrence in relation to reduced access to local ports, harbours, and facilities for all aspects of the Offshore Project is considered **Extremely Unlikely**.

Severity of Consequence

16.9.4.8 The severity of consequence in relation to reduced access to local ports, harbours, and facilities for all aspects of the Offshore Project is considered **Moderate**.

Significance of Effect

16.9.4.9 Taking the frequency of occurrence as Remote and the severity of consequence as Moderate, the overall significance of effect for all aspects of the Offshore Project is deemed **Broadly Acceptable** which is considered ALARP and **Not Significant** in EIA terms.

16.9.5 VESSEL TO STRUCTURE ALLISION RISK

16.9.5.1 Presence of structures within the Turbine Area will lead to creation of powered, drifting and internal allision risk for vessels, which may be exacerbated by loss of navigational aids such as lights and AIS signals due to storm damage and difficulty in repairing them timeously.

16.9.5.2 The spatial extent of the impact is small given that a vessel must be in close proximity to an OWF 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 effect across the various elements summarised at the end of the assessment. The forms of allision considered include:

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

Powered Allision Risk

Qualification and Quantification of Effect

16.9.5.3 Based on the quantitative assessment undertaken (see Section 16.3.3 within **Appendix 16.1, Volume 2c**), the base case annual powered vessel to structure allision frequency was estimated to be 4.53×10^{-6}, corresponding to a return period of approximately 1 in 220,809 years. This is a very low return period compared to that estimated for other UK OWF developments and is reflective of the relatively low volume of vessel traffic intersecting or passing in close proximity to the Turbine Area. When anticipating the potential for an increase in vessels associated with new aquaculture sites, up to a 20% increase in overall vessel numbers was also considered, with an estimated powered vessel to structure allision frequency of 1 every 181,925 years. Overall, this is regarded as a low allision risk particularly considering that the 20% increase was conservatively applied to total vessel numbers rather than fish farm support vessels only.

16.9.5.4 Based on historical incident data, there have been 2 reported instances of a third-party vessel alliding with an operational OWF structure in the UK during 2016 and 2022 in the Irish Sea and Southern North Sea, respectively. The former resulted in vessel damage and partial submerging, as well as a head injury sustained by one of the three crew. The allision incident occurring in 2022 resulted in minor damage to the bow with water ingress and two minor injuries to crew. Both of these incidents involved a fishing vessel, with an RNLI lifeboat attending on both occasions and a helicopter deployed in 1 case.

16.9.5.5 Vessels are expected to comply with international flag state regulations (including the COLREGs and SOLAS, outlined in measure M015) and will be able to passage plan a route which minimises risk given the promulgation of information relating to the Offshore Project (outlined in measure M012), including the charting of infrastructure on relevant nautical charts (outlined in M011). On approach, the operational marine lighting and marking on the structures (which will be agreed with the MCA and NLB, outlined in M014) will also assist in maximising awareness. It should be noted that the operational marine lighting and marking will be in compliance with IALA requirements, including in relation to the availability of AtoNs, with this secured through the AtoN Management Plan post consent in consultation with NLB and MCA. This ensures that any window during which AtoNs are not in place is minimised, and subsequently minimises the increases in allision risk.

16.9.5.6 There is also a related allision risk in the event that an AtoN goes off station. Again, the AtoN Management Plan would be implemented to ensure the off station AtoN is recovered as soon as practicable in liaison with NLB, particularly noting the presence of the DWR to the northwest of the Array Area and the high potential for adverse weather in the region, as highlighted by RYA Scotland in their Hazard Workshop materials response.

16.9.5.7 The final layout will be agreed via MCA and NLB consultation as required under MGN 654 (M010) to ensure it is safe from a surface navigation perspective (noting internal allision risk is considered further below).

16.9.5.8 Should an allision occur, the consequences will depend on multiple factors including the energy of the impact, structural integrity of the vessel, sea state at the time of the impact and type of structure contacted. 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 Turbine Area 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 MPCP will be implemented to minimise the environmental effect outlined in M031.

16.9.5.9 The embedded mitigation measures identified as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;

- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b);
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M016: Wind turbines blade clearance of at least 28.33 m above MHWS (30 m above MSL);
- M026: Development and adherence to a FMMCP;
- M031: A MPCP will be developed prior to commencement of construction;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.9.5.10 The frequency of occurrence in relation to powered allision risk for all aspects of the Offshore Project is considered **Extremely Unlikely**.

Severity of Consequence

16.9.5.11 The severity of consequence in relation to powered allision risk for all aspects of the Offshore Project is considered **Serious**.

Significance of Effect

16.9.5.12 Taking the frequency of occurrence as Extremely Unlikely and the severity of consequence as Serious, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

Drifting Allision Risk

Qualification and Quantification of Effect

16.9.5.13 Based on the quantitative assessment undertaken (see Section 16.3.4 within **Appendix 16.1, Volume 2c**), the base case annual drifting vessel to structure allision frequency was estimated to be 2.65×10^{-5}, corresponding to a return period of approximately 1 in 37,790 years. This is a low return period compared to that estimated for other UK OWF developments and is reflective of the relatively low volume of vessel traffic passing in proximity to or within the Turbine Area. When anticipating the potential for an increase in vessels associated with new aquaculture sites, up to a 20% increase in overall vessel numbers was also considered, with an estimated drifting vessel to structure allision frequency of 1 every 31,491 years. Overall, this is regarded as a low allision risk particularly considering that the 20% increase was conservatively applied to total vessel numbers rather than fish farm support vessels only.

16.9.5.14 Based on historical incident data, there have been no instances of a third-party vessel alliding with an operational OWF structure whilst Not Under Command (NUC). However, there is considered to be potential for a vessel to be adrift in the area (see Section 17.2 within **Appendix 16.1, Volume 2c**); this is reflected in the MAIB incident data reviewed in proximity to the Offshore Project Boundary which indicates that machinery failure is the most common incident type (approximately 46%). Additionally, the semi-submersible rig *Transocean Winner* ran aground at Dalmore Bay after becoming adrift due to loss of tow.

16.9.5.15 A vessel adrift may only develop into an allision situation if in proximity to an OWF structure. This is only the case where the adrift vessel is located internally within or in close proximity to the Turbine Area and the direction of the wind and/or tide directs the vessel towards a structure. It should be noted however, that for the case of *Transocean Winner*, loss of tow occurred outside the 10 nm Shipping and Navigation Study Area of the Offshore Project Boundary and, due to strong winds, drifted ashore. This type of incident occurs infrequently as it is conditional on several contributing factors, including but not limited to the presence of a rig move, adverse weather, and human error. Upon analysis of the vessel traffic survey data and the long-term vessel traffic data, no rig moves were identified as regularly occurring within the Shipping and Navigation Study Area, with one temporary rig movement recorded during July 2023 within the DWR, reflecting the infrequency of rig move operations, as well as being scheduled during periods of more favourable weather conditions. Additionally, due to the deep draught of rig moves, it is likely that these transits will occur further offshore rather than in close proximity to the Turbine Area. Moreover, from consultation feedback received during the Hazard Workshop as per **Table 16-2**, there is a growing trend for use of semi-submersible vessels for transporting rigs rather than relying on towage.

16.9.5.16 In circumstances where a vessel drifts towards a structure in the Turbine Area, 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 Turbine Area (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 effects (such as anchor snagging on a subsea cable), or the use of thrusters (depending on availability and power supply).

16.9.5.17 Where the deployment of the anchor is not possible (e.g., for small craft), any Offshore Project vessels on site may be able to render assistance in liaison with the MCA and in line with SOLAS obligations under Regulation 33 (IMO, 1974) (M015). This response will be managed via the coastguard 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.

16.9.5.18 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 MPCP will minimise the environmental effect (M031). 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.

16.9.5.19 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b);
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M016: Wind turbines blade clearance of at least 28.33 m above MHWS (30 m above MSL);
- M026: Development and adherence to a FMMCP;
- M031: A MPCP will be developed prior to commencement of construction;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.9.5.20 The frequency of occurrence in relation to drifting allision risk for all aspects of the Offshore Project is considered **Remote**.

Severity of Consequence

16.9.5.21 The severity of consequence in relation to drifting allision risk for all aspects of the Offshore Project is considered **Moderate**.

Significance of Effect

16.9.5.22 Taking the frequency of occurrence as Remote and the severity of consequence as Moderate, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

Internal Allision Risk

Qualification and Quantification of Effect

16.9.5.23 As noted previously, based on experience at existing operational OWFs, it is anticipated that commercial vessels will be unlikely to navigate internally within the Turbine Area.

16.9.5.24 Fishing and recreational vessels may be more likely to transit through the Turbine Area. For fishing vessels, feedback provided by the CFLO indicates that the presence of WTGs may create new habitats for crabs and lobsters which could increase potting activity within the Turbine Area. However, the presence of any cable protection may dictate the practicality of potting activities. For recreational vessels, 'wind farm tourism' may occur in the area, as recreational marine tours are already in operation out of Loch Roag/*Loch Ròg*, thus the presence of recreational vessels within the Turbine Area may be anticipated.

16.9.5.25 The base case annual fishing vessel to structure allision frequency (see Section 16.3.5 within **Appendix 16.1, Volume 2c**) is estimated to be 6.95×10^{-2}, corresponding to a return period of approximately 1 in 14 years. When considering a potential of a 20% increase in vessel traffic in the future, the return period increases to 1 every 12 years. This return period is reflective of the volume of fishing vessel traffic in the area, both in transit and engaged in fishing activities. This result is conservative, as the assumption is made that baseline activity in terms of proximity to WTGs will not change. In practice, fishing vessels will account for the presence of the WTGs. Furthermore, this result does not consider the potential consequences of an allision, with the worst consequences reported for vessels involving a UK OWF development having been flooding, with no life-threatening injuries to persons reported (the model is calibrated against known reported incidents).

16.9.5.26 The minimum spacing between structures of 900 m is considered sufficient for safe internal navigation (i.e., for vessels to keep clear of the OWF structures within the Turbine Area). Additionally, the final layout will be agreed via MCA and NLB consultation as required under MGN 654 to ensure it is safe from a surface navigation perspective, including in compliance with the requirements of MGN 654 (MCA, 2021), outlined in M010.

16.9.5.27 As with any passage, any vessel navigating within the Turbine Area is expected to passage plan in accordance with SOLAS Chapter V (IMO, 1974) outlined in measure M015, and the promulgation of information will ensure that such vessels have good awareness (outlined in measure M012). Operational marine lighting and marking will be in place as required by and agreed with the NLB and MCA (outlined in M014). This will include unique identification marking of each OWF structure

in an easily understandable pattern to minimise the risk of a mariner navigating internally within the Turbine Area becoming disoriented.

16.9.5.28 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 OWF 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 OWF developments. For recreational vessels with a mast, there is an additional allision risk when navigating internally within the Array Area associated with the WTG blades. However, the minimum blade tip clearance (outlined in M016) exceeds the minimum clearance the RYA recommend (22 m above MHWS) for minimising allision risk (RYA, 2019) and which is also noted in MGN 654 (MCA, 2021).

16.9.5.29 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M013: Surface piercing structures - application for safety zones of up to 500 m during construction and periods of major maintenance, and up to 50 m pre-commissioning;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b);
- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and SOLAS (IMO, 1974);
- M016: Wind turbines blade clearance of at least 28.33 m above MHWS (30 m above MSL);
- M026: Development and adherence to a FMMCP;
- M031: A MPCP will be developed prior to commencement of construction;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.9.5.30 The frequency of occurrence in relation to internal allision risk for all aspects of the Offshore Project is considered **Remote**.

Severity of Consequence

16.9.5.31 The severity of consequence in relation to internal allision risk for all aspects of the Offshore Project is considered **Moderate**.

Significance of Effect

16.9.5.32 Taking the frequency of occurrence as Remote and the severity of consequence as Moderate, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.9.6 REDUCTION IN UNDER KEEL CLEARANCE

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

Qualification of Effect

16.9.6.2 For all subsea cables relating to the Offshore Project Boundary where cable burial is applied, the minimum burial depth is 0.2 m, noting actual burial depths will be determined via the CBRA process which will be undertaken post consent once geotechnical survey data are available (outlined in M030).

16.9.6.3 Where cable burial is not possible, alternative cable protection methods may be deployed which will again be determined within the CBRA (outlined in M030). 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 MCA. This aligns with the RYA's recommendation that the "*minimum safe under keel clearance over submerged structures and associated infrastructure should be determined in accordance with the methodology set out in MGN 543 [since superseded by MGN 654]*" (RYA, 2019).

16.9.6.4 As a worst-case, Scenario 2 is considered for this impact given that this maximises the spread of cables within the OCAS and subsequent exposure for the main commercial routes and small craft navigating between the Array Area and shore. Up to 100% of cables are anticipated to require protection in the event of surface lay, although this is across cables located within both the Array Area and the OCAS. The worst-case cable protection height of 1.1 m should largely fall within the 5% requirement outlined above (22 m LAT charted depth) given that charted depths are generally greater than 20 m LAT. Installation of HDD Exit Pits at the Landfall is located approximately 500-1,500 m offshore, in water depths of 15-27 m MSL (13.5-24.7 m LAT). The Landfall Exit Pit Area is shown on **Figure 3.1c, Volume 1b**. The HDD Exit Pits will be excavated up to 3.5 m below the

seabed prior to HDD installation works. Following cable pull through, the HDD Exit Pits will be protected with inert material. The requirements for HDD Exit Pit area protection will be determined following detailed design, therefore the worst-case for the height of the HDD Exit Pit area is the same as the height for Offshore Cable protection (1.1 m LAT). However, the HDD Exit Pit area protection is likely to be lower due to the pits being excavated prior to construction works and therefore the requirement for protection will be for the Offshore Cables as they exit the pit, rather than for the HDD Exit Pit area. As noted above, where the 5% requirement cannot be met, the tolerability of any changes to depth will be discussed with the MCA, as per the requirements of MGN 654.

16.9.6.5 Additionally, based on feedback from the Hazard Workshop (see Section 4 within **Appendix 16.1, Volume 2c**), it was confirmed that aquaculture vessels which regularly transit between the Array Area and the coast are not constrained by water depths, with exact routeing subject to the skipper's preference accounting for weather conditions (see **Table 16-3**). As a result, the impact of a reduction of under keel clearance is considered to be low.

16.9.6.6 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 consequences, with the environmental effects of the latter minimised by the implementation of the MPCP (outlined in M031).

16.9.6.7 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M002: A Cable Installation Plan will be produced to confirm routeing, method of installation and aspects such as target depth of burial and need for/location of/type of external cable protection. This plan will also contain the outputs of a formal CBRA;
- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M030: Suitable implementation and monitoring of subsea cable burial, scour protection and cable protection in line with MGN 654 (via burial, or external protection where adequate burial depth as identified via risk assessment is not feasible);
- M031: A MPCP will be developed prior to commencement of construction.

Frequency of Occurrence

16.9.6.8 The frequency of occurrence in relation to reduction in under keel clearance for all aspects of the Offshore Project is considered **Reasonably Probable**.

Severity of Consequence

16.9.6.9 The severity of consequence in relation to reduction in under keel clearance for all aspects of the Offshore Project is considered **Minor** in terms of navigational safety.

Significance of Effect

16.9.6.10 Taking the frequency of occurrence as Reasonably Probable and the severity of consequence as Minor, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.9.7 VESSEL INTERACTION WITH SUBSEA CABLES

16.9.7.1 The presence of cables may increase the potential for interaction with subsea cables including via the anchors and/or fishing gear of third-party vessels.

Qualification of Effect

16.9.7.2 The spatial extent of the impact is relatively small given that a vessel must be in close proximity to an a cable for an interaction to occur.

16.9.7.3 There are 3 anchoring scenarios which are considered for this effect:

- Planned anchoring – may 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;
- Anchor dragging – caused by anchor failure.

16.9.7.4 Although the second of these scenarios may involve limited decision-making time if drifting towards a hazard, in all 3 scenarios it is anticipated that the charting of infrastructure including the subsea cables will inform the decision to anchor, as per Regulation 34 of SOLAS (IMO, 1974).

16.9.7.5 No anchored vessels were identified outside of Loch Roag/*Loch Ròg* within the vessel traffic survey data assessed, and no charted anchorages are located in proximity to the Offshore Project Boundary (see Section 16.6). Risk of interaction on a planned anchoring or anchor dragging basis is therefore anticipated to be low. In terms of emergency anchoring, any areas of high traffic volume are likely to represent the highest risk.

16.9.7.6 The likelihood of anchor interaction with a subsea cable is further minimised by the use of external cable protection where required. This will be informed by the CBRA process (outlined in M002 and M030) which will account for traffic volumes and sizes, particularly for the OCAS where main

commercial routes and small craft regularly navigate following the Isle of Lewis/*Eilean Leòdhais* coast.

16.9.7.7 Should an anchor interaction incident occur, the most likely consequences will be low based on historical anchor interaction incidents, with no 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 CBRA and consideration of MGN 654, this risk will be minimised.

16.9.7.8 Fishing gear snagging risk will depend on the type of gear deployed as well as the type of cable protection used (see **Table 16-3**). Demersal gear types are subject to increased risk compared to pelagic gear types due to their likelihood of encountering an object or cable protection on the seabed.

16.9.7.9 As outlined in Section 10.2.1 and Appendix E within **Appendix 16.1, Volume 2c**, demersal trawlers were a common gear type observed within the Shipping and Navigation Study Area; however, these vessels were estimated to be transiting rather than actively fishing based on their average speed and track behaviour. Another common gear type recorded within the Shipping and Navigation Study Area were potters, which were noted to be actively fishing within and in proximity to the Array Area. The fishing method of using pots is likely to present a low snagging risk compared to demersal trawling, as it is carried out at a slower pace and is a static gear type. Additionally, based on feedback received via the CFLO (see **Table 16-3**), only a small number of potting vessels are active within the Shipping and Navigation Study Area and operate out of Carloway Pier between April-September; thus, the impact would likely be temporally restricted in nature.

16.9.7.10 Although 100% of cables may require cable protection (outlined in **Table 16-13**), active fishing vessels are infrequent and utilise static gears, and so the likelihood of a fishing gear snagging incident is considered to be low. The risk is further reduced by the refinement of the OCAS, which decreases overlap with areas of known potting activity. The likelihood of fishing gear snagging may also be minimised by the burial of cables where possible which will be informed by the CBRA (outlined in M030). **Chapter 21, Volume 2a** provides further details of risk to commercial fishing vessels.

16.9.7.11 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M002: A Cable Installation Plan will be produced to confirm routeing, method of installation and aspects such as target depth of burial and need for/location of/type of external cable protection. This plan will also contain the outputs of a formal CBRA;
- M010: Compliance with MGN 654 and its annexes including guard vessels as required by risk assessment;

- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M026: Development and adherence to a FMMCP;
- M030: Suitable implementation and monitoring of subsea cable burial, scour protection and cable protection in line with MGN 654 (via burial, or external protection where adequate burial depth as identified via risk assessment is not feasible).

Frequency of Occurrence

16.9.7.12 The frequency of occurrence in relation to vessel interaction with subsea cables for all aspects of the Offshore Project is considered **Extremely Unlikely**.

Severity of Consequence

16.9.7.13 The severity of consequence in relation to vessel interaction with subsea cables for all aspects of the Offshore Project is considered **Moderate** in terms of navigational safety.

Significance of Effect

16.9.7.14 Taking the frequency of occurrence as Extremely Unlikely and the severity of consequence as Moderate, the overall significance of effect for all aspects of the Offshore Project is deemed **Broadly Acceptable** which is considered ALARP and **Not Significant** in EIA terms.

16.9.8 REDUCTION IN EMERGENCY RESPONSE CAPABILITY

16.9.8.1 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.

Qualification of Effect

16.9.8.2 Given the distances that would likely be covered by air-based SAR support (the SAR helicopter base at Stornoway/*Steòrnabhagh* is located approximately 15 nm from the Turbine Area), the spatial extent of this impact is considered reasonably small. The Turbine Area covers approximately 41 square nautical miles (nm^2) (141 square kilometres (km^2)) which represents a small area to search compared to other OWFs. Additionally, a SAR operation may not require the entire Turbine Area to be searched; it is more likely that, with potential drift of the casualty taken into account, a search could be restricted to a smaller area within which a casualty is known to be located.

16.9.8.3 Up to 32,034 return trips by operation and maintenance vessels may be made throughout the operation and maintenance phase. It is assumed that operation and maintenance vessels will be on

site throughout the majority of the operation and maintenance phase, although there may be instances of severe weather conditions where they may be withdrawn. 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.

16.9.8.4 However, with Offshore Project vessels to be managed through marine coordination and compliance with Flag State regulations (outlined in measure M015), the likelihood of an incident is minimised. Additionally, should an incident occur, Offshore Project vessels would likely be well equipped to assist, either through self-help capability or through SOLAS obligations under Regulation 33 (IMO, 1974), noting this would be undertaken in liaison with the MCA. The MPCP will also be implemented to minimise the environmental effects of any incident involving pollution (outlined in M031).

16.9.8.5 From recent SAR helicopter taskings data, the frequency of SAR operations in proximity to the Offshore Project Boundary is low, with no SAR helicopter incidents occurring within the Turbine Area. The frequency of SAR operations in proximity to the Turbine Area is not anticipated to change markedly from the current level given the measures noted above which will be in place. The layout will be agreed with the MCA and NLB in line with MGN 654 requirements (outlined in M010) to ensure any SAR operations that do occur within the Turbine Area are facilitated. Additionally, an ERCoP will be submitted to the MCA in line with the requirements of MGN 654 (MCA, 2021), and a SAR checklist will be completed and agreed with the MCA post consent.

16.9.8.6 The embedded mitigation measures identified (see **Table 16-14**) as relevant to reducing the effect are as follows:

- M002: A Cable Installation Plan will be produced to confirm routeing, method of installation and aspects such as target depth of burial and need for/location of/type of external cable protection. This plan will also contain the outputs of a formal CBRA;
- M010: Compliance with MGN 654 and its annexes including development and implementation of a SAR Checklist and ERCoP;
- M011: The Offshore Project infrastructure inclusive of surface piercing structures and subsea cables will be appropriately marked on Admiralty and aeronautical charts;
- M012: Timely and efficient distribution of NtMs, Kingfisher notifications, and other navigational warnings of the position and nature of works associated with the Offshore Project, including information for vessel routes, timings and locations, safety zones (around surface piercing infrastructure) and advisory passing distances;
- M014: Marking and lighting of the Array Area in agreement with NLB and as per the requirements of IALA Recommendation O-139 (IALA, 2021a) and Guidance G1162 (IALA, 2021b);

- M015: Compliance of all Offshore Project vessels with international marine regulations as adopted by the Flag State, notably the COLREGs (IMO, 1972) and SOLAS (IMO, 1974);
- M016: Wind turbines blade clearance of at least 28.33 m above MHWS (30 m above MSL);
- M029: Marine Coordination Centre established to monitor all vessel activity, issue Notices to Mariners, and serve as a contact point for all maritime stakeholders;
- M030: Suitable implementation and monitoring of subsea cable burial, scour protection and cable protection in line with MGN 654 (via burial, or external protection where adequate burial depth as identified via risk assessment is not feasible);
- M031: A MPCP will be developed prior to commencement of construction;
- M033: A LMP will be developed prior to commencement of construction;
- M039: Lighting and marking failures will be appropriately reported and rectified as soon as possible.

Frequency of Occurrence

16.9.8.7 The frequency of occurrence in relation to reduction in emergency response capability for all aspects of the Offshore Project is considered **Extremely Unlikely**.

Severity of Consequence

16.9.8.8 The severity of consequence in relation to reduction in emergency response capability for all aspects of the Offshore Project is considered **Serious** in terms of navigational safety.

Significance of Effect

16.9.8.9 Taking the frequency of occurrence as Extremely Unlikely and the severity of consequence as Serious, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.10 ASSESSMENT OF EFFECTS: DECOMMISSIONING

16.10.1 VESSEL DISPLACEMENT

16.10.1.1 Decommissioning activities associated with the removal of structures and cables may displace existing routes/activity.

Qualification and Quantification of Effect

16.10.1.2 Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, this effect is expected to be similar in nature to the equivalent construction phase effect (see Section 16.8.1). In the case of subsea cables, sections may be left in situ to avoid unnecessarily disturbance of the seabed. This would be confirmed through consultation and assessment prior to the decommissioning phase to ensure the most suitable approach was taken, including consideration of long-term navigational safety. For the purposes of this assessment (as a

worst-case) it has been assumed that all subsea cables will be removed during decommissioning with only cable protection left in situ.

16.10.1.3 The use of a buoyed decommissioning area analogous to the buoyed construction area is assumed and will result in similar main route deviations to those established for the equivalent construction phase effect.

16.10.1.4 Relevant embedded mitigation measures for this effect are analogous to the equivalent construction phase effect (see Section 16.8.1), with the addition of the development and adherence to a Decommissioning Plan (M020).

Frequency of Occurrence

16.10.1.5 The frequency of occurrence in relation to displacement of vessel traffic for all aspects of the Offshore Project is considered **Frequent**.

Severity of Consequence

16.10.1.6 The severity of consequence in relation to displacement of vessel traffic for all aspects of the Offshore Project is considered **Negligible** in terms of navigational safety.

Significance of Effect

16.10.1.7 Taking the frequency of occurrence as Frequent and the severity of consequence as Negligible, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.10.2 INCREASED THIRD-PARTY VESSEL TO THIRD-PARTY VESSEL COLLISION RISK

16.10.2.1 Vessel displacement as a result of the removal of structures and cables may increase encounters and collision risk with other third-party vessels.

Qualification and Quantification of Effect

16.10.2.2 Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, this effect is expected to be similar in nature to the equivalent construction phase (see Section 16.8.2). In the case of subsea cables, sections may be left in situ but for the purposes of this assessment (as a worst-case) it has been assumed that all subsea cables will be removed during decommissioning with only cable protection left in situ.

16.10.2.3 Relevant embedded mitigation measures for this effect are analogous to the equivalent construction phase effect (see Section 16.8.2), with the addition of the development and adherence to a Decommissioning Plan (M020).

Frequency of Occurrence

16.10.2.4 The frequency of occurrence in relation to increased third-party vessel to third-party vessel collision risk for all aspects of the Offshore Project is considered **Extremely Unlikely**.

Severity of Consequences

16.10.2.5 The severity of consequence in relation to increased third-party vessel to third-party vessel collision risk for all aspects of the Offshore Project is considered **Serious**.

Significance of Effect

16.10.2.6 Taking the frequency of occurrence as Extremely Unlikely and the severity of consequence as Serious, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.10.3 THIRD-PARTY VESSEL TO OFFSHORE PROJECT VESSEL COLLISION RISK

16.10.3.1 Offshore Project vessels associated with decommissioning activities may increase encounters and collision risk for third-party vessels already operating in the area.

Qualification of Effect

16.10.3.2 Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, this effect is expected to be similar in nature to the equivalent construction phase effect (see Section 16.8.3) including the number of return trips by vessels. In the case of subsea cables, sections may be left in situ but for the purposes of this assessment (as a worst-case) it has been assumed that all subsea cables will be removed during decommissioning with only cable protection left in situ.

16.10.3.3 Relevant embedded mitigation measures for this effect are analogous to the equivalent construction phase effect (see Section 16.8.3), with the addition of the development and adherence to a Decommissioning Plan (M020).

Frequency of Occurrence

16.10.3.4 The frequency of occurrence in relation to third-party vessel to Offshore Project vessel collision risk for all aspects of the Offshore Project is considered **Remote**.

Severity of Consequence

16.10.3.5 The severity of consequence in relation to third-party vessel to Offshore Project vessel collision risk for all aspects of the Offshore Project is considered **Serious**.

Significance of Effect

16.10.3.6 Taking the frequency of occurrence as Remote and the severity of consequence as Serious, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.10.4 REDUCED ACCESS TO LOCAL PORTS, HARBOURS, AND FACILITIES

16.10.4.1 Decommissioning activities associated with the removal of structures and cables may displace existing routes/activity restricting access to ports/harbours.

Qualification of Effect

16.10.4.2 Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, this effect is expected to be similar in nature to the equivalent construction phase effect (see Section 16.8.4), including the number of return trips by vessels. In the case of subsea cables, it is expected that they will be left in situ but for the purposes of this assessment (as a worst-case) it has been assumed that all cables will be removed during decommissioning, with only cable protection will be left in situ.

16.10.4.3 As with the construction phase, it is not yet known from which port(s) decommissioning activity will be based for the Offshore Project and therefore the same concerns raised during consultation in relation to use of Loch Roag/*Loch Ròg* are again applicable (see Section 16.8.4).

16.10.4.4 Relevant embedded mitigation measures for this effect are analogous to the equivalent construction phase effect (see Section 16.8.4), with the addition of the development and adherence to a Decommissioning Plan (M020).

Frequency of Occurrence

16.10.4.5 The frequency of occurrence in relation to reduced access to local ports, harbours, and facilities for all aspects of the Offshore Project is considered **Remote**.

Severity of Consequence

16.10.4.6 The severity of consequence in relation to reduced access to local ports, harbours, and facilities for all aspects of the Offshore Project is considered **Moderate**.

Significance of Effect

16.10.4.7 Taking the frequency of occurrence as Reasonably Probable and the severity of consequence as Moderate, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is considered ALARP and **Not Significant** in EIA terms.

16.11 ASSESSMENT OF COMBINED EFFECTS

16.11.1.1 The combined effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and maintenance, and decommissioning phases of the Offshore Project on the same receptor, or group of receptors. The overall method following in identifying and assessing potential Combined Effects in relation to the offshore environment is set out in **Chapter 5, Volume 1a**.

16.11.1.2 Combined effects could potentially arise in one of two ways. The first type of combined effect is a Project lifetime effect, where multiple phases of the Project (construction, operation and maintenance, and decommissioning) interact to create a potentially more significant effect on a receptor than in one phase alone.

16.11.1.3 The second type of combined effect is receptor-led effects. Receptor-led effects are where effects from different environmental aspects combine spatially and temporally on a receptor. These effects may be short-term, temporary, transient, or longer-term.

16.11.1.4 Receptor-led effects have been considered, where relevant, in this chapter for potential interactions between Shipping and Navigation and the following environmental aspects:

- Commercial Fisheries;
- Other Sea Users.

16.11.1.5 Full results of the Project lifetime effects and receptor-led effects assessment can be found in **Chapter 23: Combined Effects Assessment, Volume 2a**.

16.12 CONSIDERATION OF ONSHORE TRANSMISSION WORKS PROJECT

16.12.1.1 A separate application for the Project's onshore elements (the OTW Project) that includes all infrastructure landwards of Mean Low Water Springs (MLWS) within the Onshore Transmission Works Boundary will be made, under the Town and Country Planning (Scotland) Act 1997 to Comhairle nan Eilean Siar (CnES). The OTW Project EIAR will provide a full description of the onshore elements of the Project landward of MLWS, and include an assessment of the associated likely significant effects.

16.12.1.2 This EIAR has considered the additive interactions between the Offshore Project and OTW Project to understand if there is the potential for any change to the assessment outcomes as a result of both elements of the Project. The approach to identify and consider potential interactions between the Offshore Project and OTW Project is set out in **Chapter 5, Volume 1a** and key design parameters associated with the OTW Project are summarised in **Chapter 3, Volume 1a**.

16.12.1.3 The potential for effects identified in **Table 16-5** to interact with effects associated with the OTW Project at a common receptor has been considered. However, the Zone of Influence associated with Shipping and Navigation is limited spatially to the marine environment and only has the potential

to cause an effect on receptors which are in the marine environment. Further to this, the only activity to occur between MHWS and MLWS are associated with HDD and cable installation that will occur under the seabed. The works above the seabed associated with this (i.e. HDD Exit Pit construction and cable pull through vessel activities) are considered within this chapter already. As the works between MHWS and MLWS are below the seabed there is no potential for impact to Shipping and Navigation receptors. Following consideration of the OTW Project and likely ZOI and influence on common receptors, there are no pathways that have the potential to effect Shipping and Navigation receptors. As a result of this, there is no pathway for these effects to interact in addition to the OTW Project and this is not considered further.

16.13 ASSESSMENT OF CUMULATIVE EFFECTS

16.13.1 APPROACH

16.13.1.1 A CEA examines the potential for impacts of the Offshore Project in addition with 'Other Developments' (including the OTW Project) on the same single receptor or resource and the contribution of the Offshore Project to those impacts. The overall method following in identifying and assessing potential cumulative effects in relation to the offshore environment is set out in **Chapter 5, Volume 1a**.

16.13.1.2 The Shipping and Navigation screening approach is based on the methodology outlined in Section 16.5.2 and in Section 3.3 within **Appendix 16.1, Volume 2c**.

16.13.1.3 The conclusions of the assessment of the Offshore Project and any additional effect arising from the OTW Project as identified in this chapter have been considered in this CEA. However, given the assumed mitigation and conclusion drawn within Section 16.12 there are no material additional impacts resulting from the OTW Project.

16.13.2 CUMULATIVE EFFECTS ASSESSMENT

16.13.2.1 For Shipping and Navigation, a Zone of Influence (ZOI) has been applied to ensure direct and indirect cumulative effects can be appropriately identified and assessed. This ZOI equates to a 50 nm buffer of the Array Area which is considered sufficient to capture cumulative vessel traffic patterns. This ZOI has been defined on the basis that there is not considered to be a direct pathway for impacts between the Offshore Project Boundary and any development beyond 50 nm from the Array Area. The Shipping and Navigation ZOI is shown in **Figure 16-5: Overview of the Shipping and Navigation Cumulative ZOI Developments, Volume 2b**.

16.13.2.2 A short list of Other Developments that may interact with the Offshore Project ZOIs during their construction, operation and maintenance or decommissioning is presented in **Appendix 5.3: Cumulative Effects Assessment Shortlisted Developments, Volume 1c**. This list has been

generated applying criteria set out in **Chapter 5, Volume 1a** and has been collated up to the finalisation of the EIA through desk study, consultation, and engagement.

16.13.2.3 Only those Other Developments in the short list that fall within the Shipping and Navigation ZOI have the potential to result in cumulative effects with the Offshore Project on Shipping and Navigation. All Other Developments falling outside the Shipping and Navigation ZOI are excluded from this assessment. The following types of Other Developments have the potential to result in cumulative effects on Shipping and Navigation:

- OWFs;
- Oil and gas platforms;
- Subsea cables and pipelines;
- Other developments which have the potential to alter the marine environment.

16.13.2.4 On the basis of the above, the Other Developments that are scoped into the Shipping and Navigation CEA are outlined in **Table 16-15**. The statuses listed are correct as of March 2025. All listed developments are included in the Shipping and Navigation CEA.

16.13.2.5 The cumulative Project Design Envelope is described in **Table 16-15**.

Table 16-15 Developments considered as part of the CEA for Shipping and Navigation

ID (Figure 16-5, Volume 2b)	Development type	Application reference	Description of development	Status	Timescale[3]	Confidence in assessments	Tier[4]	Distance to the Array Area (nm)
1	Havbredey	OWF-026	Offshore Wind Farm	Proposed (Scoping Report submitted)	Construction to commence by 2032 and becoming operational by 2036. Lifetime of 35 years from commencement of operation with decommissioning from 2071.	Medium	Tier 3	29.7
2	Talisk Offshore Wind Project	ENG-018	Offshore Wind Farm	Proposed (Scoping Report submitted)	Construction to start in 2030.	High	Tier 3	15.1

[3] The Planning Inspectorate Advice Note 17 states '*Where other developments are expected to be completed before construction of the proposed Major Infrastructure Project and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment*.'

[4] Chapter 5 sets out the full definitions of the tiers. Tier 1: high level of certainty or information availability (including under construction or where a planning application has been approved or is awaiting decision). Tier 2: medium level of certainty or information (such as developments where a Scoping Report has been submitted). Tier 3: low level of certainty or information available (no planning applications submitted or identified for potential future development only).

ID (Figure 16-5, Volume 2b)	Development type	Application reference	Description of development	Status	Timescale[3]	Confidence in assessments	Tier[4]	Distance to the Array Area (nm)
3	Spaceport 1 Sub-Orbital Vertical Launch Spaceport	ON-005	Vertical launch facility	Under construction	Initial phase of construction commenced in November 2024 with earliest operation in autumn 2025.	High	Tier 3	44.8

Table 16-16 Cumulative Project Design Envelope for Shipping and Navigation

Project phase and activity / impact	Scenario	Justification
Construction and Decommissioning		
Vessel displacement and increased vessel to vessel collision risk (third-party to third-party vessels)	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.
Vessel to vessel collision (third-party vessel to Offshore Project vessel)	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.
Reduced access to local ports, harbours, and facilities	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.

Project phase and activity / impact	Scenario	Justification
Operation		
Vessel displacement and increased vessel to vessel collision risk (third-party to third-party vessels)	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.
Vessel to vessel collision (third-party vessel to Offshore Project vessel)	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.
Reduced access to local ports, harbours, and facilities	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.
Increased vessel to structure allision risk	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.
Reduced under keel clearance due to cable protection	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.
Anchor and/or fishing gear interaction with subsea cables	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.

Project phase and activity / impact	Scenario	Justification
Reduction of emergency response capability due to increased incident rates and/or reduced access for SAR responders	Parameters as listed for the equivalent impact in **Table 16-13** with the addition of the concurrent and full build out of the cumulative developments.	As stated for the equivalent impact in **Table 16-13**.

16.13.2.6 A description of the significance of cumulative effects upon Shipping and Navigation receptors arising from each identified impact is given below. The cumulative effects assessment has been based on information publicly available in the planning application documents for the Other Developments. It is noted that the maximum assessment assumptions quoted within these planning applications (EIARs / ESs) are often refined during the determination period and in the post-consent phase such that the final scheme's build out may have a reduced impact when compared to what has previously been assessed.

Vessel Displacement

16.13.2.7 Construction, O&M, and decommissioning activities associated with the installation of structures and cables associated with the Offshore Project and cumulative developments may displace existing routes/activity. All cumulative developments requiring consideration are categorised as Tier 3 (see **Table 16-15**), therefore Tiers 1 and 2 will not be considered further.

16.13.2.8 There are 2 main commercial routes expected to deviate as a result of the presence of nearby future developments (whether due to the presence of a buoyed construction / decommissioning area or surface structures). These are routes 1 and 4 (see Section 11.2 within **Appendix 16.1, Volume 2c**), which have mean positions 3.7 nm and 9.5 nm northwest of the Array Area, respectively. Since these routes are not directly impacted by the Offshore Project, it is not considered appropriate to quantify the displacement (i.e., the deviations are not influenced by the presence of the Offshore Project).

16.13.2.9 Route 1 follows the DWR and passes parallel to the Array Area, Talisk OWF, and Havbredey OWF. The mean passing distance from Havbredey OWF may increase given the current mean passing distance may be less than 1 nm, but this is not expected to substantially affect the mean position of the route across the region as a whole, including where it passes the Array Area.

16.13.2.10 Route 4 interacts with Talisk OWF and Havbredey OWF. Should this route pass south of Talisk OWF, then the mean passing distance from the Array Area may decrease; indeed, the route may adapt to use the DWR. However, this is not expected to result in a substantial deviation across the region as a whole in terms of increased journey time and distance.

16.13.2.11 During launches at Spaceport 1, a temporary exclusion zone of up to 135 nm from the launch site may be put in place. It is unlikely the main commercial routes will be cumulatively impacted by the Offshore Project and an Exclusion Zone associated with Spaceport 1. Any impact would be transient in nature (up to 4 hours, 10 times per year) and restricted to the area immediately surrounding the launch vehicle (Atlantic58, 2023). It is also expected that the operator of Spaceport 1 will coordinate with the Applicant where a temporary exclusion zone may interact with the Offshore Project and the immediate environment.

16.13.2.12 On this basis, the frequency of occurrence of cumulative displacement of vessel traffic is considered **Frequent** and the severity of consequence is considered **Negligible**. Therefore, the overall

significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

Increased Third-Party Vessel to Third-Party Vessel Collision Risk

16.13.2.13 Vessel displacement as a result of construction, operation and maintenance, and decommissioning activities associated with the Offshore Project and cumulative developments may increase encounters and collision risk between third-party vessels operating in the area. All cumulative developments requiring consideration are categorised as Tier 3 (see **Table 16-15**), therefore Tiers 1 and 2 will not be considered further.

16.13.2.14 With the cumulative displacement outlined above, increased vessel densities in the area could lead to an increase in vessel to vessel encounters and therefore increased collision risk.

16.13.2.15 This is applicable for Route 4 should it adapt to use the DWR which is already utilised by Routes 1 and 2. This evolution of vessel traffic movements is independent of the presence of the Offshore Project, although the Array Area may affect the ability of a vessel to safely take collision avoidance action in the event of an encounter, including a full round turn. However, as detailed for the equivalent in isolation impact (see Section 16.8.2), there is considered to be sufficient sea room for such a manoeuvre to be undertaken safely.

16.13.2.16 For Spaceport 1, should a temporary exclusion zone be put in place in proximity to the Offshore Project this may reduce navigable sea room and subsequently increase collision risk. However, any impact would be transient in nature (up to 4 hours, 10 times per year) and restricted to the area immediately surrounding the launch vehicle (Atlantic58, 2023). It is also expected that the operator of Spaceport 1 will coordinate with the Applicant where a temporary exclusion zone may interact with the Offshore Project and the immediate environment.

16.13.2.17 On this basis, the frequency of occurrence of increased cumulative third-party to third-party vessel collision risk is considered **Extremely Unlikely** and the severity of consequence is considered **Serious**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

Third-Party Vessel to Offshore Project Vessel Collision Risk

16.13.2.18 Offshore Project vessels associated with construction, operation and maintenance, and decommissioning activities associated with the Offshore Project and cumulative developments may increase encounters and collision risk for third-party vessels already operating in the area.

Tier 3

16.13.2.19 There is the potential that the same ports or similarly located ports could be used by cumulative developments in terms of base ports for construction, operation and maintenance vessels, and/or decommissioning vessels. On this basis, there may be an overall cumulative increase in Offshore Project vessel presence within the general area, and as such the potential for increased encounters

and collision risk with third-party traffic. However, all developers (including the Applicant) are expected to establish appropriate vessel management systems including through marine coordination, and as such any encounters will be managed, including by COLREGs and SOLAS.

16.13.2.20 On this basis, the frequency of occurrence of increased cumulative third-party to third-party vessel collision risk is considered **Remote** and the severity of consequence is considered **Serious**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

Reduced Access to Local Ports, Harbours, and Related Facilities

16.13.2.21 Construction, O&M, and decommissioning activities associated with the Offshore Project and cumulative developments may increase the risk of reduced access to local harbours. All cumulative developments requiring consideration are categorised as Tier 3 (see **Table 16-15**), therefore Tiers 1 and 2 will not be considered further.

16.13.2.22 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 due to activities associated with cumulative developments beyond those outlined for the equivalent in isolation impact (see Section 16.8.4).

16.13.2.23 There is potential for reduced access to Loch Roag/*Loch Ròg* should future developments utilise Loch Roag/*Loch Ròg* as a base port during their construction phase, operation and maintenance phase and/or decommissioning phase. It is currently not known which ports will be used for the Offshore Project nor for Talisk OWF or Havbredey OWF, though it is considered unlikely that simultaneous use of Loch Roag/*Loch Ròg* will occur. However, in the event that this arises, it is anticipated that the developments would coordinate activities in liaison with the Western Isles Council so as to ensure that access constraints are minimised. As identified for the in isolation assessment, if required a dedicated risk assessment should be undertaken post consent taking account of vessel traffic in Loch Roag/*Loch Ròg* and full details of planned Offshore Project vessels, their movements and bases (outlined in M024 and M029). Promulgation of information to allow mariners to passage plan accordingly (outlined in M012) and the NSVMP (M022) are again considered key mitigation measures.

16.13.2.24 On this basis, the frequency of occurrence of cumulative reduced access to local harbours is considered **Reasonably Probable** and the severity of consequence is considered **Moderate**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

Vessel to Structure Allision Risk

16.13.2.25 Presence of structures associated with the Offshore Project and cumulative developments will lead to creation of powered, drifting and internal allision risk for vessels, which may be exacerbated by loss of navigational aids such as lights and AIS signals due to storm damage and difficulty in

repairing them timeously. All cumulative developments requiring consideration are categorised as Tier 3 (see **Table 16-15**), therefore Tiers 1 and 2 will not be considered further.

16.13.2.26 The nearest screened in cumulative development is Talisk OWF, located in excess of 15 nm northeast of the Array Area. Given the available sea room between the Turbine Area and the screened-in developments, it is unlikely that vessels will experience increased allision risk beyond the localised risk when passing any given development. This is compounded by the requirement for each individual development to implement marine lighting and marking in agreement with NLB and MCA and in compliance with IALA G1162 (IALA, 2021).

16.13.2.27 As noted in relation to vessel displacement, there is potential that the mean passing distance from the Array Area of Route 4 may decrease due to displacement associated with Talisk OWF, with potential that the route may adapt to use the DWR. However, this is not expected to significantly increase allision risk for this route, noting the 1.9 nm separation between the DWR and Array Area.

16.13.2.28 On this basis, the frequency of occurrence of cumulative powered allision risk is considered **Extremely Unlikely** and the severity of consequence is considered **Serious**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

16.13.2.29 The frequency of occurrence of cumulative drifting allision risk is considered **Remote** and the severity of consequence is considered **Moderate**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

16.13.2.30 The frequency of occurrence of cumulative internal allision risk is considered **Remote** and the severity of consequence is considered **Moderate**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

Reduction in Under Keel Clearance

16.13.2.31 The presence of protection over subsea cables associated with the Offshore Project and cumulative developments may reduce charted water depths leading to increased risk of under keel interaction for passing vessels. All cumulative developments requiring consideration are categorised as Tier 3 (see **Table 16-15**), therefore Tiers 1 and 2 will not be considered further.

16.13.2.32 No specific subsea developments have been screened into the cumulative assessment (see **Table 16-15**) although there will be transmission infrastructure associated with Talisk OWF and Havbredey OWF.

16.13.2.33 Effects associated with under keel clearance are generally localised to individual cables, in particular in areas where water depths are low (e.g., landfalls), where cable crossings occur resulting in greater cable protection height, or in a scenario where vessel movements may be altered resulting

in increased navigation over an area with reduced water depths. Subsea cables associated with Talisk OWF and Havbredey OWF are not expected to be located in proximity to the Offshore Project Boundary and the respective arrays are not anticipated to substantially influence vessel movements in proximity to the Offshore Project Boundary. Therefore, no cumulative effect is identified.

16.13.2.34 Nevertheless, as per the Offshore Project-only assessment (see Section 16.9.6), the localised effect from the Offshore Project Boundary will be managed via MGN 654 compliance in terms of limiting any reductions in charted water depth to less than a 5% change unless agreed otherwise with the MCA (outlined in M030). The same mitigations will apply for any future subsea cable developments.

16.13.2.35 On this basis, the frequency of occurrence of cumulative reduction in under keel clearance is considered **Reasonably Probable** and the severity of consequence is considered **Minor**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

Vessel interaction with Subsea Cables

16.13.2.36 Presence of Array Cables to Landfall and/or Array Cables to OSP associated with the Offshore Project and cumulative developments may increase the potential for interaction with subsea cables including via the anchors and/or fishing gear of third-party vessels. All cumulative developments requiring consideration are categorised as Tier 3 (see **Table 16-15**), therefore Tiers 1 and 2 will not be considered further.

16.13.2.37 As per the cumulative assessment of under keel clearance reduction above (see Section 16.9.6), the effect of anchor or fishing gear interaction is considered localised to individual cables. The CBRA undertaken by the Applicant (outlined in M030) will ensure cable burial and protection is suitable including accounting for existing cables, with similar assessments required to be undertaken by any other subsea cable developments.

16.13.2.38 Given the distance between the Offshore Project Boundary and cumulative developments, it is not anticipated that any anchoring or fishing activity located in proximity to cumulative developments could be directly displaced into the proximity of the Offshore Project Boundary.

16.13.2.39 On this basis, the frequency of occurrence of cumulative vessel interaction effect is considered **Extremely Unlikely** and the severity of consequence is considered **Moderate**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Broadly Acceptable** which is ALARP and **Not Significant** in EIA terms.

Reduction in Emergency Response Capability

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

All cumulative developments requiring consideration are categorised as Tier 3 (see **Table 16-15**), therefore Tiers 1 and 2 will not be considered further.

16.13.2.41 The presence of additional Offshore Project vessels and activities in the region will increase the potential for multiple incidents occurring simultaneously, creating additional stress on emergency responders. However, given baseline incident rates, and noting the additional resources that would be available for the Offshore Project and other cumulative developments, there is not considered likely to be a notable effect on emergency response resources on a cumulative level. This takes account of historical data showing that allisions and collisions caused by OWFs do not occur at a high frequency (see Section 16.6.1).

16.13.2.42 Under MGN 654, all OWF developments will be required to agree a layout with the MCA to ensure suitable SAR access is available. As such no cumulative impact on SAR access is anticipated noting SAR operations are likely to be localised to individual areas (i.e., unlikely to span both the Offshore Project Boundary and other cumulative developments given the nearest screened in development is in excess of 15 nm from the Array Area).

16.13.2.43 On this basis, the frequency of occurrence of cumulative impacts on emergency response capability is considered **Extremely Unlikely** and the severity of consequence is considered **Serious**. Therefore, the overall significance of effect for all aspects of the Offshore Project is deemed **Tolerable with Mitigation** which is ALARP and **Not Significant** in EIA terms.

16.14 TRANSBOUNDARY EFFECTS

16.14.1.1 Transboundary effects occur when a development in one European Economic Area (EEA) State impacts the environment of another EEA State(s). A screening of potential transboundary effects was undertaken within the Scoping Report.

16.14.1.2 As per Section 16.5.3, transboundary effects in terms of vessel routeing (including to international ports) are considered and have been assessed in Sections 16.8, 16.9, and 16.10 (for the Offshore Project in isolation) and Section 16.11 (on a cumulative basis). Individual transits may have the potential to be associated with vessels that are internationally owned or located; however, any such transits have been captured within the baseline assessment of vessel traffic noting that AIS carriage requirements are set by the IMO and apply across EEAs. As such, no further on transboundary effects assessment is required.

16.15 SUMMARY OF RESIDUAL EFFECTS

16.15.1.1 **Table 16-17**Table 16-17 presents a summary of the assessment of significant impacts, any relevant secondary mitigation, and residual effects on Shipping and Navigation receptors.

Table 16-17 Summary of residual effects for Shipping and Navigation

Activity and Impact	Receptor	Frequency of Occurrence	Severity of Consequence	Embedded Mitigation Measures			Significance of effect (significance)	Further environmental Mitigation	Assessment of Residual Effect (significance)
Construction									
Vessel displacement	All vessels	Frequent	Negligible	M010 M011 M012 M013	M014 M015 M022 M026 M029	M033 M033 M039 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Increased third-party vessel to third-party vessel collision risk	All vessels	Extremely Unlikely	Serious	M010 M011 M012	M013 M014 M022 M026	M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Third-party to Offshore Project vessel collision risk	All vessels	Remote	Serious	M010 M011 M012 M013	M014 M015 M022 M024 M026	M029 M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**

Activity and Impact	Receptor	Frequency of Occurrence	Severity of Consequence	Embedded Mitigation Measures			Significance of effect (significance)	Further environmental Mitigation	Assessment of Residual Effect (significance)
Reduced access to local ports, harbours, and facilities	All vessels	Remote	Moderate	M011 M012	M015 M022 M024	M026 M029	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Operation and maintenance									
Vessel displacement	All vessels	Frequent	Negligible	M010 M011 M012 M013	M014 M015 M022 M026	M029 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Increased third-party vessel to third-party vessel collision risk	All vessels	Extremely Unlikely	Serious	M010 M011 M012 M013	M014 M022 M026 M029	M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Third-party to Offshore Project vessel collision risk	All vessels	Extremely Unlikely	Serious	M010 M011 M012 M013 M014	M015 M022 M024 M026	M029 M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**

Activity and Impact	Receptor	Frequency of Occurrence	Severity of Consequence	Embedded Mitigation Measures			Significance of effect (significance)	Further environmental Mitigation	Assessment of Residual Effect (significance)
Reduced access to local ports, harbours, and facilities	All vessels	Extremely Unlikely	Moderate	M012 M014 M015	M022 M024 M026	M029 M033 M039	Broadly Acceptable **(Not Significant)**	N/A	Broadly Acceptable **(Not Significant)**
Powered vessel to structure allision risk	All vessels	Extremely Unlikely	Serious	M010 M011 M012	M013 M015 M016	M026 M029 M031	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Drifting vessel to structure allision risk	All vessels	Remote	Moderate	M010 M011 M012 M013	M014 M015 M016 M026	M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Internal vessel to structure allision risk	All vessels	Remote	Moderate	M010 M011 M012 M013	M014 M015 M016 M026	M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Reduction in under keel clearance	All vessels	Reasonably Probable	Minor	M002 M010	M011 M012	M030 M031	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**

Activity and Impact	Receptor	Frequency of Occurrence	Severity of Consequence	Embedded Mitigation Measures			Significance of effect (significance)	Further environmental Mitigation	Assessment of Residual Effect (significance)
Vessel interaction with subsea cables	All vessels	Extremely Unlikely	Moderate	M002 M010	M011 M012	M026 M030	Broadly Acceptable **(Not Significant)**	N/A	Broadly Acceptable **(Not Significant)**
Reduction in emergency response capability	All vessels	Extremely Unlikely	Serious	M002 M010 M011 M012	M014 M015 M016 M029	M030 M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Decommissioning									
Vessel displacement	All vessels	Frequent	Negligible	M010 M011 M012 M013	M014 M015 M020	M026 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Increased third-party vessel to third-party vessel collision risk	All vessels	Extremely Unlikely	Serious	M010 M011 M012 M013	M014 M020 M026	M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**

Activity and Impact	Receptor	Frequency of Occurrence	Severity of Consequence	Embedded Mitigation Measures			Significance of effect (significance)	Further environmental Mitigation	Assessment of Residual Effect (significance)
Third-party to Offshore Project vessel collision risk	All vessels	Remote	Serious	M010 M011 M012 M013	M014 M015 M020 M026	M029 M031 M033 M039	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**
Reduced access to local ports, harbours, and facilities	All vessels	Remote	Moderate	M011 M012	M015 M020	M026 M029	Tolerable with Mitigation **(Not Significant)**	N/A	Tolerable with Mitigation **(Not Significant)**

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16.16 GLOSSARY OF TERMS AND ABBREVIATIONS

16.16.1.1 A list of key terms and acronyms used in this chapter are provided in **Table 16-18** and **Table 16-19**.

Table 16-18 Acronyms and abbreviations

Term	Definition
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
AtoN	Aid to Navigation
BATNEEC	Best Available Technology Not Entailing Excessive Cost
CAA	Civil Aviation Authority
CaP	Cable Plan
CBRA	Cable Burial Risk Assessment
CCC	Clyde Cruising Club
CD	Chart Datum
CEA	Cumulative Effects Assessment
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea
CTV	Crew Transfer Vessel
DfT	Department for Transport
DSLP	Development Specification and Layout Plan
DWR	Deep Water Route
EEA	European Economic Area
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ERCoP	Emergency Response Cooperation Plan
EU	European Union
FLiDAR	Floating Light Detection and Ranging
FLO	Fisheries Liaison Officer
FSA	Formal Safety Assessment
GT	Gross Tonnage
HDD	Horizontal Directional Drilling
HVDC	High Voltage Direct Current
IALA	International Organization for Marine Aids to Navigation
IHO	International Hydrographic Organisation
IMO	International Maritime Organization
LMP	Lighting and Marking Plan
LNG	Liquefied Natural Gas
m	Metre
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate - Licensing Operations Team

MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MOD	Ministry of Defence
MPCP	Marine Pollution Contingency Plan
MSL	Mean Sea Level
NLB	Northern Lighthouse Board
nm	Nautical Mile
nm^2	Square Nautical Mile
NRA	Navigational Risk Assessment
NSVMP	Navigational Safety and Vessel Management Plan
NUC	Not Under Command
OCAS	Offshore Cable Area of Search
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
PAC	Preliminary Application Consultation
PEXA	Practice and Exercise Area
PLL	Potential Loss of Life
Radar	Radio Detection and Ranging
RAM	Restricted in their Ability to Manoeuvre
RNLI	Royal National Lifeboat Institution
RoPax	Roll-on/Roll-off Passenger
RoRo	Roll-on/Roll-off Cargo
RYA	Royal Yachting Association
SAR	Search and Rescue
SFF	Scottish Fishermen's Federation
SLHA	Space Launch Hazard Area
SOLAS	International Convention for the Safety of Life at Sea
SPS	Significant Peripheral Structure
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
ZOI	Zone of Influence

Table 16-19 Glossary

Term	Meaning
Allision	Contact between a vessel and a stationary object.
The Applicant	Spiorad na Mara Limited (the Project owner)
Array Area	The offshore area within which the offshore wind turbine generators (WTGs), associated foundations, Offshore Cables, and Offshore Substation Platform (OSP) (if required), will be located. This area encompasses the Turbine Area that will contain all above water surface infrastructure (WTGs / OSP) and an additional area within which further below water infrastructure (foundations and cables) may also be located.
Array Cables	The offshore electrical and communication cables that connect infrastructure located within the Array Area, for: • Scenario 1: Array Cables will be used to connect Wind Turbine Generators (WTGs) to each other, and to connect WTGs to the OSP. • Scenario 2: Array Cables will be used to connect WTGs to each other.
Array Cables to Landfall	The offshore electrical and communication cables located in the Array Area and Offshore Cables Area of Search that connect the wind turbine generators (WTGs) directly to Landfall for Scenario 2.
Automatic Identification System (AIS)	A system by which vessels automatically broadcast their identity, key statistics including location, destination, length, speed, and current status, e.g., under power. Most commercial vessels and United Kingdom (UK)/European Union (EU) fishing vessels over 15 metre (m) length are required to carry AIS.
Collision	The act of colliding (crashing) between 2 moving objects.
Cumulative Effects	Considers the likely significant effects of multiple impacts and activities from several developments.
Cumulative Effects Assessment (CEA)	Assessment of effects as a result of the incremental changes caused by other past, present and reasonably foreseeable human activities and natural processes together with the Offshore Project.
Embedded or 'Designed-in' Mitigation	Mitigation measures to avoid or reduce environmental effects that are directly incorporated into the preferred design for the Project. This can include standard practice in accordance with or without guidance. Embedded Mitigation is considered as part of the impact assessment, before effect significance is identified.
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed development over and above the existing circumstances (or 'baseline').
Formal Safety Assessment (FSA)	A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity.
Future Baseline	Refers to the situation in future years without the Offshore Project.
Hazard Workshop	A consultation opportunity for Shipping and Navigation stakeholders to discuss navigational hazards associated with the Offshore Project in order to feed into the Navigational Risk Assessment process.

Marine Guidance Note (MGN)	A system of guidance notes issued by the Maritime and Coastguard Agency (MCA) which provide significant advice relating to the improvement of the safety of shipping at sea, and to prevent or minimise pollution from shipping.
Maximum Design Scenario	The scenario within the Project Design Envelope with the potential to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor. See **Chapter 3: Project Description, Volume 1a** for detailed description.
Navigational Risk Assessment (NRA)	A document which assesses the impacts to Shipping and Navigation of a proposed Offshore Renewable Energy Installation (OREI) based upon FSA.
Offshore Cables	Electrical and communication cables located within the Array Area and Offshore Cable Area of Search. The Offshore Cables consist of Array Cables, Array Cables to Landfall, and Export Cables.
Offshore Cable Area of Search (OCAS)	The area within which the offshore cable infrastructure between the Array Area and Landfall up to Mean High Water Springs (MHWS) will be located.
Offshore Landfall Area	The area seaward of Mean High Water Springs (MHWS) within the Offshore Cable Area of Search (OCAS) that includes works associated with the Horizontal Directional Drill (HDD) installation, including HDD exit pit(s) (located below MLWS) and offshore cable connection to the onshore (TJB) (located above MHWS).
Offshore Project	The offshore components of the Spiorad na Mara offshore wind farm (the Project) located seaward of Mean High Water Springs (MHWS).
Offshore Project Boundary	The 'red line boundary' encompassing the Offshore Project.
Offshore Substation Platform (OSP)	The optional offshore substation located within the Turbine Area. Includes the platform and associated components which allows the voltage to be increased to meet onward transmission requirements.
Offshore Wind Farm (OWF)	A group of WTGs located offshore.
Onshore Transmission Works (OTW) / Onshore Project	The onshore components of the Spiorad na Mara offshore wind farm (the Project) located landward of Mean Low Water Springs (MLWS). The Applicant will seek consent for the OTW Project through a separate application and so does not form part of this application.
Project	The Spiorad na Mara offshore wind farm development. This term describes the whole development, including all offshore and onshore components.
Radio Detection and Ranging (Radar)	An object-detection system which uses radio waves to determine the range, altitude, direction, or speed of objects.
Regular Operator	A vessel operator identified from the vessel traffic data to be regularly utilising the sea room in the vicinity of the proposed Offshore Project.
Safety Zone	A statutory marine zone demarcated for the purposes of safety around a possibly hazardous installation or works/construction area.
Scoping Opinion	A report presenting the written opinion of the Scottish Ministers, with input from Comhairle nan Eilean Siar (CnES) for the OTW, as to the scope and level of detail

	of information to be provided in the Environmental Impact Assessment (EIA) for the Project.
Scoping Report	A document submitted by a developer that outlines the potential environmental issues and effects of a proposed project to determine which topics, methods, and level of detail should be included in the full Environmental Impact Assessment (EIA).
Spiorad na Mara Offshore Wind Farm	The Project.
Turbine Area	A reduced area within the Array Area where above water surface infrastructure would be located i.e. wind turbine generators (WTG) or Offshore Substation Platform (OSP) (if required). This area has been developed and refined through stakeholder consultation and environmental assessment.
Unique Vessel	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. Individual vessels are identified using their Maritime Mobile Service Identity (MMSI).
Wind Turbine Generator (WTG)	The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment.

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