

MachairWind Offshore Windfarm

Chapter 13 Shipping and Navigation



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TABLE OF CONTENTS

Glossary of Acronyms	v
Glossary of Terms	vii
13 Shipping and Navigation	1
13.1 Introduction.....	1
13.2 Legislation, Policy and Guidance	2
13.3 Consultation	3
13.4 Existing Data Sources	25
13.5 Site-specific Survey Data	25
13.6 Shipping and Navigation Study Area	26
13.7 Realistic Worst-Case Scenarios.....	28
13.8 Existing Environment.....	34
13.9 Embedded Mitigation.....	43
13.10 Approach to Assessment	47
13.11 Assessment of Significance	51
13.12 Cumulative Effects	95
13.13 Transboundary Effects	100
13.14 Inter-Related and Interacting Impacts	100
13.15 Potential Monitoring Requirements.....	107
13.16 Summary	107
References	110

List of Tables

Table 13.1 Summary of relevant legislation, policy and guidance	2
Table 13.2 Summary of consultation relevant to shipping and navigation	5
Table 13.3 Summary of meetings relevant to shipping and navigation.....	23
Table 13.4 Summary of key datasets and information sources	25
Table 13.5 Site-specific survey data.....	25
Table 13.6 Realistic worst-case scenarios for impacts on shipping and navigation	29
Table 13.7 Description of base case main commercial routes within the shipping and navigation Study Area	42
Table 13.8 Embedded mitigation measures for shipping and navigation.....	43
Table 13.9 Frequency of occurrence ranking definitions.....	47
Table 13.10 Definition of terms relating to the severity of consequence.....	48
Table 13.11 IMO FSA risk matrix for shipping and navigation	48
Table 13.12 Summary of terminology differences between EIA and NRA for shipping and navigation	49
Table 13.13 Significance of effect for impact 1: vessel displacement and increased third-party vessel to vessel collision risk	61
Table 13.14 Significance of effect for impact 2: increased third-party vessel to project vessel collision risk ..	66
Table 13.15 Significance of effect for impact 3: reduced access to local ports and harbours	70
Table 13.16 Significance of effect for impact 4: reduction of emergency response capabilities.....	75



Table 13.17 Significance of effect for impact 5: vessel to structure allision risk	84
Table 13.18 Significance of effect for impact 6: reduction of under keel clearance	87
Table 13.19 Significance of effect for impact 7: anchor interaction with subsea cables	90
Table 13.20 Shipping and navigation combined assessment summary	94
Table 13.21 Potential cumulative impacts (impact screening)	95
Table 13.22 Shipping and navigation inter-relationships.....	100
Table 13.23 Potential interaction between impacts – construction	102
Table 13.24 Potential interactions between impacts – operation and maintenance	103
Table 13.25 Potential interaction between impacts – decommissioning.....	104
Table 13.26 Potential interactions between impacts – phase and lifetime assessment	105
Table 13.27 Summary of potential effects for shipping and navigation.....	108

List of Figures

Figure 13.1 Overview of the shipping and navigation Study Area	27
Figure 13.2 Navigational features in proximity to the WDA.....	35
Figure 13.3 14 days of vessel traffic data by vessel type within the shipping and navigation Study Area (winter 2023).....	37
Figure 13.4 14 days of vessel traffic data by vessel type within the shipping and navigation Study Area (summer 2024)	38
Figure 13.5 Base case main commercial routes within the shipping and navigation Study Area	41

List of Appendices

Appendix 13.1 Navigational Risk Assessment	
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GLOSSARY OF ACRONYMS

Term	Definition
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
CA	Cruising Association
CalMac	Caledonian MacBrayne
CD	Chart Datum
CFA	Clyde Fishermen's Association
CMAL	Caledonian Maritime Assets
COLREGs	Convention on International Regulations for Preventing Collisions at Sea
CTV	Crew Transfer Vessel
DfT	Department for Transport
DSLPL	Development Specification and Layout Plan
EEA	European Economic Area
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ERCoP	Emergency Response Co-operation Plan
FSA	Formal Safety Assessment
HAT	Highest Astronomical Tide
HM	His Majesty
HMCG	His Majesty's Coastguard
IALA	International Organization for Marine Aids to Navigation
IHO	International Hydrographic Organization
IMO	International Maritime Organization
km	Kilometre
kt	Knot
LiDAR	Light Detection and Ranging
LMP	Lighting and Marking Plan
LSE	Likely Significant Effects
m	Metre
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate Licensing and Operations Team



Term	Definition
MGN	Marine Guidance Note
MPCP	Marine Pollution Contingency Plan
NLB	Northern Lighthouse Board
nm	Nautical Mile
nm ²	Square Nautical Mile
NRA	Navigational Risk Assessment
NSP	Navigational Safety Plan
O&M	Operation and Maintenance
OnTDA	Onshore Transmission Development Area
OSP	Offshore Substation Platform
PLL	Potential Loss of Life
Radar	Radio Detection and Ranging
RAM	Restricted in Ability to Manoeuvre
RNLI	Royal National Lifeboat Institution
RYA	Royal Yachting Association
SAR	Search and Rescue
SEIA	Social and Economic Impact Assessment
SFF	Scottish Fishermen's Federation
SMP	Sectoral Marine Plan
SOLAS	International Convention for the Safety of Life at Sea
SWCRIFG	Scottish West Coast Regional Inshore Fisheries Group
SWFPA	Scottish White Fish Producers Association
TSS	Traffic Separation Scheme
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UN	United Nations
VMP	Vessel Management Plan
VMS	Vessel Monitoring System
WDA	Windfarm Development Area
WTG	Wind Turbine Generator



GLOSSARY OF TERMS

Term	Definition
Allision	The act of striking or collision of a moving vessel against a stationary object.
Cable protection	Protective measure to minimise the effects of scour and hazards along the offshore cables (e.g. to prevent cable exposure or snagging of vessel anchors or fishing gear), as well as for protecting these cables at infrastructure crossing points.
Collision	The act or process of two moving objects colliding.
Development Area	Application boundary for consenting purposes which, for the Project, consists of a Windfarm Development Area, Offshore Export Cable Corridor, and Onshore Transmission Development Area. Separate consent and marine licence applications will be submitted for each Development Area where applicable.
Embedded mitigation measure	Mitigation measures, including industry good practice measures, that are directly incorporated into the design for the MachairWind Windfarm Development Area to avoid or reduce environmental effects.
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').
Environmental Impact Assessment (EIA) Regulations	A collective term referring to The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017.
Highest astronomical tide (HAT)	The highest level that can be expected to occur under average meteorological conditions and under any combination of astronomical conditions.
Inter-array cables (IACs)	Armoured cable containing electrical and fibre optic cores which link the wind turbine generators to each other and to the offshore substation platform(s).
Landfall	The area from Mean Low Water Springs to a transition bay(s), where the offshore export cable(s) come ashore.
Lowest Astronomical Tide (LAT)	The lowest level that can be expected to occur under average meteorological conditions and under any combination of astronomical conditions.
MachairWind Offshore Windfarm	<p>An offshore windfarm capable of exporting around 2 GW of renewable energy to the National Electricity Transmission System. MachairWind Offshore Windfarm comprises three Development Areas:</p> <ul style="list-style-type: none"> • The WDA – located on the west coast of Scotland to the northwest of Islay and west of Colonsay; • The Offshore Export Cable Corridor – a preliminary boundary extending from the WDA to mean high water springs at a landfall location near Girvan, South Ayrshire; and • The Onshore Transmission Development Area – a preliminary boundary which extends landward from mean low water springs and includes the land required for the landfall of the offshore export cables and their route up to but not including the proposed high voltage direct current switching station which will be developed and constructed by Transmission Owner, ScottishPower Transmission. <p>Separate consent and licence applications will be submitted for each Development Area.</p>
Mean High Water Springs (MHWS)	The average, over a year, of the heights of two successive high waters during those periods of 24 hours (once every fortnight) when the range of the tide is greatest.
Mean Low Water Springs (MLWS)	The average, over a year, of the heights of two successive low waters during those periods of 24 hours (once every fortnight) when the range of the tide is greatest.
Mean sea level	The average level of the sea taking account of all tidal effects but excluding surge events.



Term	Definition
Offshore export cable	Armoured cable containing electrical cores between the offshore substation platform(s) and landfall. Offshore export cables will include bundled fibre optic cables. The offshore export cables are subject to Marine Licence applications under the Marine (Scotland) Act 2010. The portion of the offshore export cable(s) located within the WDA is assessed as part of this MachairWind WDA EIA and a marine licence application to construct, alter or improve this portion has been submitted alongside the WDA application. A separate marine licence application will be submitted for the portion of the offshore export cable(s) from the WDA boundary to Mean High Water Springs.
Offshore Export Cable Corridor (ECC)	The preliminary boundary extending from the WDA to mean high water springs near Girvan, South Ayrshire and within which the offshore export cable(s) will be located. A separate marine licence application will be submitted for the offshore export cable(s) located within the Offshore ECC.
Offshore Substation Platform (OSP)	An offshore platform with a fixed foundation located within the WDA which houses electrical equipment such as transformers, switchgear, protection and control systems, and enables the windfarm's renewable electricity to be collected via inter-array cables and exported to the National Electricity Transmission System via offshore export cables.
Offshore Substation Platform (OSP) link cables	Electrical cables which link OSPs (if more than one OSP is required). These cables will include fibre optic cores or bundled fibre optic cables. OSP link cables will be wholly located within the WDA.
Onshore Transmission Development Area (OnTDA)	The preliminary boundary which extends landward from mean low water springs and includes the land required for the landfall of the offshore export cables and their route up to but not including the proposed high voltage direct current switching station which will be developed and constructed by Transmission Owner, ScottishPower Transmission. This Transmission Owner is responsible for consenting the high voltage direct current switching station. Onward connections to the National Electricity Transmission System will be consented by National Grid Electricity Transmission and ScottishPower Transmission. Where relevant, these are considered as part of cumulative effects assessment in the EIA.
Operational life	The operational life is the expected length of time from final commissioning of the WDA until the cessation of commercial operations. This is anticipated to be 35 years.
Option Agreement Area (OAA)	The seabed area awarded to ScottishPower Renewables in January 2022 through the ScotWind leasing round.
OSPAR	OSPAR started in 1972 with the Oslo Convention against dumping and was broadened to cover land-based sources of marine pollution and the offshore industry by the Paris Convention of 1974. These two conventions were unified, updated and extended by the 1992 OSPAR Convention. OSPAR is so named because of the original Oslo and Paris Conventions ("OS" for Oslo and "PAR" for Paris).
Safety zones	An area of water around or adjacent to a wind turbine generator or Offshore Substation Platform and associated substructure which is to be constructed, extended, operated or decommissioned, from which certain or all classes of vessels are excluded and within which activities can be regulated for the purpose of securing safety of the wind turbine generator, substructure or vessels in that vicinity, and individuals on both the wind turbine generator, substructure or vessel, in line with Section 95 of the Energy Act 2004.
ScotWind	A Crown Estate Scotland seabed leasing round which enabled developers to propose offshore wind projects and apply for seabed rights to plan and build windfarms in Scottish waters.
Scour protection	Protective measures to avoid sediment being eroded away from the base of the wind turbine generator foundations as a result of the flow of water.



Term	Definition
The Applicant	The legal entity submitting consent applications for the MachairWind Offshore Windfarm, namely MachairWind Limited.
The Project	MachairWind Offshore Windfarm including all its Development Areas and associated infrastructure.
Vessel Monitoring System (VMS)	A system used in commercial fishing to allow environmental and fisheries regulatory organisations to monitor, minimally, the position, time at a position, and course and speed of fishing vessels.
Windfarm Development Area (WDA)	The application boundary within the OAA where consent will be sought for the proposed WDA infrastructure. The WDA infrastructure is subject to Section 36 consent and marine licence applications (generation and transmission) which are being applied for separately from the Offshore ECC infrastructure and OnTDA infrastructure.
WDA infrastructure	The offshore generation and transmission infrastructure located within the WDA including but not limited to: WTGs, WTG fixed foundations (and associated scour protection), OSP(s), OSP fixed foundations (and associated scour protection), IACs, OSP link and offshore export cable(s) and their associated external cable protection (insofar as these are located within the WDA) and fibre optic cables.
Wind Turbine Generator (WTG)	A wind turbine generator which converts wind energy into electrical energy. Each wind turbine generator is a complex system composed of a high number of components. Typically, the main components include the rotor assembly (composed of three blades and a hub); the nacelle (containing a generator, shaft and gearbox, power electronic converter and transformer); and the tower (containing lifting equipment and the switchgear).



13 SHIPPING AND NAVIGATION

13.1 INTRODUCTION

1. This chapter presents an assessment of potential impacts and likely significant effects (LSE) on shipping and navigation that may arise from the construction, operation and maintenance (O&M), and decommissioning of the MachairWind Windfarm Development Area (WDA) infrastructure.
2. The grid connection location for the Project was only confirmed in August 2025 following lengthy delays stemming from the National Electricity System Operator's 2022 Holistic Network Design (HND) process (see **Chapter 1 Introduction** for further information). Consequently, this topic chapter considers the WDA Study Area and existing environment only (within an inclusive 10 nautical mile (nm) buffer of the WDA) only. A combined assessment of the construction, O&M and decommissioning of the WDA activities, Offshore Export Cable Corridor (ECC) and Onshore Transmission Development Area (OnTDA) activities (commensurate with the level of detail that is available at the time of carrying out that appraisal) is also provided. This approach will ensure a holistic view is undertaken of the entire Project. As noted in **Chapter 1 Introduction**, the assessment of potential effects on all receptors associated with the Offshore ECC and OnTDA will be presented in individual Environmental Impact Assessment (EIA) Reports (EIARs), which will be submitted separately in accordance with the relevant Environmental Impact Assessment (EIA) Regulations.
3. This chapter considers the following WDA infrastructure: Wind Turbine Generators (WTG), Offshore Substation Platforms (OSP) and associated fixed foundations and scour protection, inter-array cables (IACs), OSP link cables, the portion of the offshore export cable located within the WDA and associated cable protection.
4. This chapter has been prepared to provide Marine Directorate - Licensing and Operations Team (MD-LOT) (on behalf of the Scottish Ministers) and stakeholders with sufficient information to determine the LSE of the Project on the receiving environment.
5. This chapter should be read in conjunction with the following related EIAR chapters:
 - **Chapter 12 Commercial Fisheries** – Considers LSE on commercial fishing vessels engaged in fishing activities;
 - **Chapter 17 Infrastructure and Other Marine Users** – Considers activities (such as use of vessels) that cross over with the shipping and navigation assessment and therefore should be considered together; and
 - **Chapter 18 Socio-economics** – Considers socio-economic impacts relating to the use of ports by the Project.
6. Key inter-relationships between this chapter and those listed above will be considered where relevant and presented in this chapter.
7. Additional information to support the shipping and navigation assessment includes:
 - **Appendix 12 Outline Lighting and Marking Plan;**
 - **Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan;** and
 - **Appendix 13.1 Navigational Risk Assessment.**
8. This chapter was prepared by Anatec Limited.



13.2 LEGISLATION, POLICY AND GUIDANCE

9. The overarching policy and legislation relevant to the EIA is described in **Chapter 2 Policy and Legislative Context**. **Table 13.1** sets out the relevant legislation, policy and guidance that informs the assessment for shipping and navigation.

Table 13.1 Summary of relevant legislation, policy and guidance for shipping and navigation

Relevant Policy or Guidance	Relevance to the Assessment
Legislation	
United Nations (UN) Convention on the Law of the Sea (UNCLOS) (UN, 1982)	Sets out legal framework for the seas and oceans and regulates the use of marine resources.
Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1972/77)	Governs the conduct of vessels to minimize the risk of collisions.
International Convention for the Safety of Life at Sea (SOLAS) Chapter V (IMO, 1974)	Specifies minimum requirements for the construction, equipment and operation of vessels, compatible with their safety.
Electricity Act 1989 (His Majesty's (HM) Government, 1989)	A declaration under Section 36A of the Electricity Act 1989 is being made with respect to proposed generating infrastructure within the WDA and would come into effect when any approval is given by the Scottish Ministers to the Development Specification and Layout Plan covering the WDA. See Section 2.9.2 of Chapter 2 Policy and Legislative Context for further details.
Policy	
United Kingdom (UK) Marine Policy Statement (HM Government, 2011)	Sets out how marine plan authorities and decision makers should take into account 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.
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.
Scotland's Sectoral Marine Plan (SMP) 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 water wind technologies, and covers both Scottish inshore and offshore waters.
Updated Draft SMP for Offshore Wind Energy (Scottish Government, 2025).	
Social and Economic Impact Assessment [SEIA] for the Draft SMP for Offshore Wind Energy (Scottish Government, 2025).	The Updated Draft SMP is supported by a SEIA, which includes a plan level assessment of individual Plan Option and cumulative development impacts on shipping and navigation. The SEIA has been reviewed to inform this assessment. However, it should be noted that the high-level nature of the SEIA and the associated suite of assumptions made within it differ from the more detailed project-level assessment presented in this chapter.
Guidance	
Marine Guidance Note (MGN) 654	Highlights issues that shall be considered when assessing the potential effect on navigational safety from offshore renewable energy developments proposed in UK



Relevant Policy or Guidance	Relevance to the Assessment
	internal waters, territorial sea or Renewable Energy Zones.
MGN 372 Amendment 1 (Merchant and Fishing) Offshore Renewable Energy Installations (OREI): Guidance to Mariners Operating in the Vicinity of UK OREIs (Maritime and Coastguard Agency (MCA), 2022)	Highlights the issues to be considered when planning and undertaking voyages in the vicinity of OREIs in UK waters.
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 manmade structures in the marine environment. This includes subsea, surface-piercing, and fixed structures as well as those placed above navigable channels so as to ensure the safety of marine traffic.
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.
IALA Guidance G1185 Enhancing the Safety and Efficiency of Navigation Around Offshore Renewable Energy Installations Edition 1.0 (IALA, 2024)	Guidance, based on current best practice and knowledge, when considering navigational safety issues in and around OREI.
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.

13.3 CONSULTATION

10. This shipping and navigation chapter has been informed by engagement with various stakeholders, including those listed below:
 - Caledonian Maritime Assets Ltd (CMAL);
 - Caledonian MacBrayne (CalMac) Ferries;
 - Clyde Fishermen’s Association (CFA);
 - DFDS;
 - Local WDA fishers;
 - MCA;
 - Northern Lighthouse Board (NLB);
 - Port of Glensanda;
 - Royal Highland Yacht Club;
 - RYA Scotland;
 - Scottish Fishermen’s Federation (SFF);
 - Scottish West Coast regional Inshore Fisheries Group (SWCRIFG);
 - Scottish White Fish Producers Association (SWFPA); and
 - UK Chamber of Shipping.

11. As part of the consultation process, the Applicant presented the approach to assessment to stakeholders to offer transparency around the scoping methodology and rationale, capture stakeholder advice and guidance, and incorporate stakeholder feedback, where appropriate. A summary of the approach to stakeholder communication and consultation is outlined in **Chapter 6 Consultation and Stakeholder Engagement**.

12. Consultation with infrastructure and marine user stakeholders (e.g., offshore wind developers, port managers, and harbour associations) was conducted through the pre-application stage of the



Project, with feedback from such organisations helping to inform the design of the Project. Further information on consultation with infrastructure and marine user stakeholders is detailed in Section 17.3 of **Chapter 17 Infrastructure and Other Marine Users**.

13. Two Hazard Workshops (meetings of local and national marine stakeholders to identify and discuss potential shipping and navigation hazards) were held, including a local Hazard Workshop on Islay, involving predominantly small-craft users such as fishers, and a mainland Hazard Workshop in Edinburgh for all others. Both workshops offered a hybrid set up, enabling those unable to join in-person to join virtually, maximising opportunities for participation. Using the information gathered from the Hazard Workshops, a Hazard Log was produced for use as input into the risk assessment undertaken in **Section 13.11**, with the Hazard Log itself provided in **Appendix 13.1 Navigational Risk Assessment**. Stakeholders invited to attend the Hazard Workshops included various fishing representatives at both a local and national level, recreational representatives at both a local and national level (including the Cruising Association (CA)), and Regular Operators identified as using the area, including CalMac Ferries and DFDS. Further detail of the Hazard Workshops is provided in **Appendix 13.1 Navigational Risk Assessment**.
14. The consultation outcomes in relation to shipping and navigation are outlined in **Table 13.2**, which summarises stakeholder feedback, outlines how the Applicant has responded to the feedback received, and details how it has been considered within this chapter. In addition, **Table 13.3** summarises additional meetings to those outlined in **Table 13.2** held between the Applicant and stakeholders that are relevant to shipping and navigation.



Table 13.2 Summary of consultation relevant to shipping and navigation

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
Pre-Scoping Opinion				
1.	MCA	11 October 2023: consultation meeting	The planned winter and summer survey dates, as well as the intention of using a 12-month AIS dataset to assess long-term vessel traffic, are suitable for use.	Suitability of the dates considered are acknowledged within Section 13.5 .
Scoping Opinion				
2.	NLB	04 November 2024: Scoping response	NLB are scheduled to conduct major refurbishment projects on both the Dubh Artach and Skerryvore lighthouses, from 2027 through until 2032, and these works will utilise a large number of helicopter flights and ship visits to this area. These operations may coincide with the construction phase of the Project, and the need to define the safe limits for aviation and vessel operations in this area for both projects should be considered at an early stage.	As per Appendix 13.1 Navigational Risk Assessment , following consultation site refinements have been made in line with NLB requirements. NLB have confirmed they are content with the EIA WDA following refinement.
3.	RYA Scotland	04 November 2024: Scoping response	Appropriate ports which could likely be used during each of the phases should be listed in the EIA.	Noting that further technical and commercial due diligence will be undertaken post-consent before a decision is made as to the final ports used for the Project, the most likely to be used during each stage are considered within the risk assessment in Section 13.11 .
4.	RYA Scotland	04 November 2024: Scoping response	Only about a quarter of recreational vessels passing through the WDA transmit an Automatic Identification System (AIS) signal.	As per Section 13.5 , dedicated vessel traffic surveys have captured traffic within the shipping and navigation Study Area using Radio Detection and Ranging (Radar) as well as AIS. RYA Scotland have also been consulted as part of the Navigational Risk Assessment (NRA) process.
5.	RYA Scotland	04 November 2024: Scoping response	The WDA is on the direct route from Ireland to the west of Mull, through the Passage of Tiree to the north or to the	Impact on recreational vessels has been assessed within the risk assessment in

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			Western Isles. Circumventing the WDA would add considerably to the length of the voyage. Smaller boats from the Clyde will tend to pass east of Islay and Colonsay to avoid the area proposed for the Project due to its reputation for rough seas.	Section 13.11. In summary, it is considered likely that recreational vessels on this route will be able to pass through the WDA with minimal restrictions when considering the mitigations in place.
6.	RYA Scotland	04 November 2024: Scoping response	Failure of aids to navigation, as well as obscuration of key aids to navigation, should be included as potential hazards.	The distance between structures associated with the Project and the Dubh Artach lighthouse has been increased since Scoping (see Appendix 13.1 Navigational Risk Assessment), with minimum distance between the WDA and the lighthouse (specifically, the helipad) now 2 nm. Impacts on the lighthouse have been assessed in Appendix 13.1 Navigational Risk Assessment . Further discussion with NLB regarding aids to navigation contingencies will take place post-consent, including within the Lighting and Marking Plan (LMP) process as described in Section 13.9 .
7.	RYA Scotland	04 November 2024: Scoping response	The proposed export corridor route should be presented.	The Offshore ECC at this stage is presented in Appendix 13.1 Navigational Risk Assessment .
8.	RYA Scotland	04 November 2024: Scoping response	Although cable laying is not normally an issue for recreational boaters, the busy area off the Mull of Kintyre is characterised by strong currents and there is a Traffic Separation Scheme [TSS] not far offshore, which recreational boaters need to avoid.	Potential for additional factors in recreational vessel impacts from the Offshore ECC are assessed in Section 13.12.2 .
9.	RYA Scotland	04 November 2024: Scoping response	RYA Scotland and the Cruising Association would both like to contribute to the Navigational Risk Assessment.	As per Section 13.3 , RYA Scotland and the Cruising Association were both consulted with during the NRA process, and Northern



I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			The developers also consult the Irish Cruising Club and Sail Ireland as many Irish boats pass through the area.	Ireland recreational representatives were also invited to attend the Hazard Workshops.
10.	RYA Scotland	04 November 2024: Scoping response	<p>The maps of the 2015 Marine Recreation and Tourism Survey are available on NMPi. These are probably an underestimate of the current amount of recreational traffic given the encouragement to sail in these waters given by, for example, the MalinWaters project.</p> <p>The writers of the EIA may find it useful to refer to the Firth of Clyde volume of the Clyde Cruising Club Sailing Directions and Anchorages as this includes Northern Ireland. The proposed wind farm site is covered in the Kintyre to Ardnamurchan volume.</p> <p>Alan Stevenson's (1848) Account of the Skerryvore Lighthouse: with notes on the illumination of lighthouses is worth reading to provide background on the conditions experienced in that area.</p>	As per Section 13.4 , the Marine Recreation and Tourism Survey maps are considered as a data source. The data sources used during the EIA process were presented during the Hazard Workshops, with no concerns raised. As per item 9, Northern Ireland recreational representatives were also invited to attend.
11.	RYA Scotland	04 November 2024: Scoping response	Once the plan is approved, it is essential that the Clyde Cruising Club is informed so that an amendment can be issued to the relevant volume of their Sailing Directions and Anchorages. If there is to be cable laying around the Mull of Kintyre then mitigation might include working with Scottish Canals to encourage greater use being made of the Crinan Canal for the duration of the works.	As per Section 13.9 , information relating to the various Shipping and Navigation-related Project plans will be promulgated to relevant parties.
12.	MCA	22 November 2024: Scoping response	<p>The MCA noted that the EIA Report should supply detail on the possible impact on navigational issues for both commercial and recreational craft, specifically:</p> <ul style="list-style-type: none"> • collision risk; • navigational safety; • visual intrusion and noise; • risk management and emergency response; • marking and lighting of site and information to mariners; 	<p>Collision risk and the likely squeeze of small craft into the routes of larger commercial vessels have been assessed within Section 13.11.1.1 and Section 13.11.1.2.</p> <p>Navigational safety has been assessed throughout Section 13.11.</p> <p>Visual intrusion and noise, as well as the effect on small craft</p>

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			<ul style="list-style-type: none"> • 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. 	<p>navigational/communication equipment and marking and lighting of site have been assessed within Appendix 13.1 Navigational Risk Assessment.</p> <p>Risk management and emergency response have been assessed within Section 13.11.1.4.</p> <p>The risk to drifting recreational craft in adverse weather or tidal conditions has been assessed within Section 13.11.1.5.</p>
13.	MCA	22 November 2024: Scoping response	<p>The development area carries moderate traffic with several important commercial shipping routes to/from UK ports. Attention needs to be paid to routing, particularly in heavy weather so that vessels can continue to make safe passage without large-scale deviations. The likely cumulative and in combination effects on shipping routes should be considered for this project. It should consider the proximity to other windfarm developments, other infrastructure, and the impact on safe navigable sea room. We note that the proposed windfarm development area (WDA) is closing off the Dubh Artach Lighthouse to the vessels navigating West, Southwest and Southeast of the wind farm, we recommend the applicant to consult with Northern Lighthouse Board (NLB) regarding this and consider impacts on local AtoNs as a risk within the EIAR and NRA.</p>	<p>Adverse weather routeing has been assessed within Appendix 13.1 Navigational Risk Assessment and in Section 13.11.</p> <p>Cumulative developments have been screened based on criteria described in Appendix 13.1 Navigational Risk Assessment. As per Section 13.12, and the Dubh Artach lighthouse refurbishment works have been screened into the CEA.</p> <p>As per Section 13.3, NLB have been consulted regarding the Dubh Artach lighthouse. As per Appendix 13.1 Navigational Risk Assessment, site refinements have been made to facilitate NLB access requirements. Impacts on the lighthouse as an aid to navigation have been assessed in Appendix 13.1 Navigational Risk Assessment.</p>



I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
14.	MCA	22 November 2024: Scoping response	An NRA will need to be submitted in accordance with MGN 654. The NRA should be accompanied by a detailed MGN 654 Checklist.	An NRA has been submitted, with associated MGN 654 checklist included in Appendix 13.1 Navigational Risk Assessment .
15.	MCA	22 November 2024: Scoping response	We note that the MGN 654 compliant data will be presented within the NRA.	As per item 52 of this table, MCA were content with the suitability of the vessel traffic data presented within the NRA.
16.	MCA	22 November 2024: Scoping response	We understand that a Cumulative Effects Assessment will be carried out in a tiered system of appraisal as detailed in the Scoping report. As highlighted, the proximity to other offshore windfarms and infrastructure will need to be fully considered, with an appropriate assessment of the distances between OREI boundaries and shipping routes as per MGN 654. Attention must be paid to the traffic to ensure the established shipping routes within the area can continue safely without unacceptable deviations.	Cumulative developments have been screened based on criteria described in Appendix 13.1 Navigational Risk Assessment . A Cumulative Effects Assessment has been undertaken in Section 13.12 , which considers the distance between other infrastructure and vessel traffic in the area.
17.	MCA	22 November 2024: Scoping response	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 Chart Datum (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 13.9 , any cable protection will be compliant with MGN 654, including in relation to under keel clearance. The Burial Protection Index study and anchor penetration study will be captured as part of the Cable Burial Risk Assessment (CBRA) process (an embedded mitigation measure included in Section 13.9) as required.
18.	MCA	22 November 2024: Scoping response	The Development Specification and Layout Plan (DSLPL) will require MCA approval prior to construction. Any additional navigation safety and/or Search and Rescue (SAR) requirements, as per MGN 654 Annex 5, will be agreed at the approval stage.	The DSLP and compliance with MGN 654 are included as mitigation, with the creation of an Emergency Response Co-operation Plan (ERCoP) also included (as per Section 13.9).

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
19.	MCA	22 November 2024: Scoping response	Particular consideration will need to be given to the implications of the site size and location on SAR resources and ERCoPs. Due consideration should be given to the use of appropriate mitigation as outlined in MGN 654 Annex 5 and a SAR checklist will also need to be completed.	A SAR checklist is required under MGN 654, which will be adhered to as per Section 13.9 .
20.	MCA	22 November 2024: Scoping response	MGN 654 Annex 4 requires that hydrographic surveys should fulfil the requirements of the International Hydrographic Organization (IHO) Order 1a standard.	As per Section 13.9 , there will be full MGN 654 compliance including in relation to hydrographic surveys.
21.	MCA	22 November 2024: Scoping response	Impacts on safe access to ports should be included as a potential impact of the project, applicable during construction, O&M, and decommissioning phases. The WDA is located in the mouth of the Firth of Lorn which has a considerable amount of international and local traffic. 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.	The potential for reduced access to local ports and harbours has been included within the risk assessment in Section 13.11 .
22.	MCA	22 November 2024: Scoping response	Once the location for the new HVDC switching station in South Ayrshire has been identified, the Applicant will progress separate consent applications for the OfTDA and OnTDA. Each consent application and associated assessments will take account of the wider Project. If an HVDC transmission cable is used, a study should be undertaken to establish the electromagnetic deviation, affecting ship compasses and other navigating systems, of the high voltage cable route to the satisfaction of the MCA. On receipt of the study, the MCA reserves the right to request a deviation survey of the cable route post installation.	As noted in Section 13.1 , the assessment of potential effects on all receptors associated with the Offshore ECC and OnTDA will be presented in individual EIARs, which will be submitted separately in accordance with the relevant EIA Regulations. Electromagnetic Field (EMF) impacts on vessels in the vicinity to cables which will be Direct Current (DC) are assessed within Appendix 13.1 Navigational Risk Assessment .
23.	UK Chamber of Shipping	22 November 2024: Scoping response	The scoping report proposes a deviation to a distinct north-south cargo route, which is a matter of concern.	Deviations to the route in question are identified in Appendix 13.1 Navigational

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			This deviation may result in increased steaming distances, additional operational costs, and movement into more constrained inshore waters, raising safety risks for commercial and recreational vessels.	Risk Assessment , with risks resulting from the route deviation assessed within Section 13.11 . As per Appendix 13.1 Navigational Risk Assessment , site refinements have been made to reduce impacts on this route.
24.	UK Chamber of Shipping	22 November 2024: Scoping response	<p>The EIA should include:</p> <ul style="list-style-type: none"> • A full 12-month AIS dataset analysis to ensure seasonal variations in vessel activity are captured. • At least 20 years of Marine Accident Investigation Branch (MAIB) data to provide a comprehensive historical perspective on navigational risks. • An assessment of the navigational risks posed by isolated structures at the southern tip of the WDA, including their potential impact on vessel operations. 	<p>12 months of AIS data have been considered within the long-term vessel traffic assessment in Appendix 13.1 Navigational Risk Assessment.</p> <p>A total of 20 years of MAIB incident data has been assessed within Section 13.8.1.2.</p> <p>As per Appendix 13.1 Navigational Risk Assessment, the WDA has been refined to remove the potential for an isolated structure at the southern extent.</p>
25.	UK Chamber of Shipping	22 November 2024: Scoping response	Transboundary effects must also be assessed, with the potential for offshore developments in Northern Ireland and the Republic of Ireland to have significant implications for shipping routes	The potential for cumulative and transboundary effects is assessed in Section 13.12 and Section 13.13 respectively.
26.	UK Chamber of Shipping	22 November 2024: Scoping response	Emergency anchoring and refuge options for vessels should be assessed, particularly in poor weather conditions or during incidents near the WDA. Coordination with the MCA and other maritime authorities should be demonstrated to ensure robust incident response procedures are in place.	Anchoring and safe haven optionality is described within Appendix 13.1 Navigational Risk Assessment . Emergency anchoring has been discussed within the risk assessment in Section 13.11 .
27.	UK Chamber of Shipping	22 November 2024: Scoping response	The potential impacts on existing aids to navigation (including lighthouses) and outline mitigation measures to maintain their functionality should be assessed, with adjustments to the eastern Routeing and Licensing	As per Appendix 13.1 Navigational Risk Assessment , site refinements have been made, with the NLB expressing content on the updates (see 25 September 2025 entries). Further discussion with NLB

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			Boundary (RLB) explored to better accommodate shipping receptors and reduce navigational constraints.	regarding the lighting arrangements will take place post-consent, including within the LMP process (as described in Section 13.9).
28.	UK Chamber of Shipping	22 November 2024: Scoping response	The UK Chamber of Shipping and other stakeholders such as the CA and identified Regular Operators should be included in ongoing consultation.	As per Section 13.3 , the UK Chamber of Shipping, CA, and Regular Operators in the area have been engaged with and were invited to the NRA workshops.
29.	UK Chamber of Shipping	22 November 2024: Scoping response	Alternative site configurations within the wider development area be explored to minimise interference with established shipping routes and enhance navigational safety.	Site refinements have been made (see Appendix 13.1 Navigational Risk Assessment), with the UK Chamber of Shipping expressing contentment on the reductions (see 25 September 2025 entries).
30.	UK Chamber of Shipping	22 November 2024: Scoping response	We recommend that commercial and environmental impacts of deviations be explicitly included in the Environmental Impact Assessment, as they represent significant considerations for maritime operations.	<p>The impacts of deviations around the WDA have been addressed within the risk assessment in Section 13.11. As per the consultation meeting on 25 September 2025, the UK Chamber of Shipping are content with the site refinement made.</p> <p>In addition, as per the email on 12 December 2025, DFDS are content with the WDA boundary as it has been amended.</p>
31.	UK Chamber of Shipping	22 November 2024: Scoping response	The Chamber is particularly concerned about the potential impact on existing Aids to Navigation (AtoNs), including the Dubh Artach Lighthouse, which serves as a critical navigational aid for vessels in this region. The Environmental Impact Assessment (EIA) must evaluate how the development, including wind turbines and associated infrastructure, might affect the visibility and operational functionality of these AtoNs. This should include an assessment of potential electromagnetic interference on electronic navigation systems and the visibility of lighthouses. Mitigation measures, such as	<p>Refinements to the WDA with regards to the Dubh Artach Lighthouse and the WDA's southern tip are detailed in Section 4.6.2.1 and Section 4.6.2.3 of Chapter 4 Site Selection and Alternatives respectively.</p> <p>An assessment of potential electromagnetic interference on electronic navigation systems is presented in Appendix 13.1 Navigational Risk Assessment.</p>

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			enhanced marking and lighting of turbines, must align with the standards set by the Maritime and Coastguard Agency (MCA) and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA). Additionally, isolated structures at the southern tip of the development area pose specific navigational risks. Their placement could obstruct vessel routes, create pinch points in constrained waters, and increase risks during adverse weather conditions. The EIA should examine the layout of turbines in this area, ensuring they do not interfere with key routes or emergency anchoring and refuge options.	The Applicant confirms that the proposed mitigation measures with regards to shipping and navigation must align with the standards set by the Maritime and Agency (MCA) and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA).
32.	MD-LOT	09 January 2025: Scoping response	The two separate 14 day periods of AIS data meet the standard MGN 654 requirement.	Suitability of the dates considered are acknowledged within Section 13.5 .
33.	MD-LOT	09 January 2025: Scoping response	MAIB data included in the EIA should cover a 20-year period to fully assess trends and historic incidents.	A total of 20 years of MAIB incident data has been assessed within Section 13.8.1.2 .
34.	MD-LOT	09 January 2025: Scoping response	Each of the possible impacts on navigational issues outlined in the MCA representation should be addressed within the EIA.	Each of the potential impacts to shipping and navigation have been assessed within the risk assessment in Section 13.11 .
35.	MD-LOT	09 January 2025: Scoping response	A Navigational Risk Assessment in accordance with MGN 654 will be required, accompanied by a detailed MGN 654 checklist.	As per Section 13.1 , an NRA has been submitted as an appendix to the EIA (Appendix 13.1 Navigational Risk Assessment).
36.	MD-LOT	09 January 2025: Scoping response	MCA representation must be fully addressed within the EIA and a SAR checklist must be completed by the Developer in consultation with the MCA.	This table sets out where MCA consultation outputs including from scoping have been addressed. A SAR checklist is required under MGN 654, which will be adhered to as per Section 13.9 .



I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
37.	MD-LOT	09 January 2025: Scoping response	A cumulative risk assessment between neighbouring offshore renewable project boundaries and nearby routing must be enacted in line with MGN Standard 654 in the EIA.	The potential for cumulative and transboundary effects is assessed in Section 13.12 .
38.	MD-LOT	09 January 2025: Scoping response	Impacts on navigational safety relating to the Dubh Artach and Skerryvore lighthouse refurbishment work must be fully addressed in the EIA.	Cumulative impacts to Navigational safety relating to the Dubh Artach refurbishment works have been included in the cumulative screening as per Section 13.12.2 .
39.	MD-LOT	09 January 2025: Scoping response	It is advised that transboundary effects are considered within the EIA report.	Transboundary effects are assessed within Section 13.13 .
40.	MD-LOT	09 January 2025: Scoping response	Traffic surveys should be supported by a 12-month AIS analysis for consideration.	12 months of AIS data have been considered within the long-term vessel traffic assessment in Appendix 13.1 Navigational Risk Assessment .
41.	MD-LOT	09 January 2025: Scoping response	The inclusion of possible port locations into the EIA Report for consideration is requested.	Noting that further technical and commercial due diligence will be undertaken post-consent before a decision is made as to the final ports used for the Project, the most likely to be used during each stage are considered within the risk assessment in Section 13.11 .
42.	MD-LOT	09 January 2025: Scoping response	The Scottish Ministers advise that Marine Accident Investigation Branch data included in the EIA Report should cover a 20-year period to fully assess trends and historic incidents.	A total of 20 years of MAIB incident data has been assessed within Section 13.8.1.2 .
43.	MD-LOT	09 January 2025: Scoping response	The Scottish Ministers highlight the SFF representation relating to WTG spatial footprint for consideration [which is as follows]: “Our primary concern is the spatial footprint of the WTGs foundation, therefore, SFF would propose to the Applicant	Shipping and navigation hazards are assessed within Section 13.11 , which considers worst-case WTG dimensions (as listed in Section 13.7).

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			to use the monopile design (which has lesser spatial footprint).”	
44.	MD-LOT	09 January 2025: Scoping response	The RYA representation around loss of station, failure of Aids to Navigation marking the devices and delays around sharing of information is highlighted, which should be fully addressed in the EIA Report.	This table sets out where RYA consultation outputs including from scoping have been addressed for each of the points raised.
45.	MD-LOT	09 January 2025: Scoping response	The Developer will be required to submit a Navigational Risk Assessment in accordance with MGN 654, accompanied by a detailed MGN 654 checklist.	An NRA has been submitted, with associated MGN 654 checklist included in Appendix 13.1 Navigational Risk Assessment .
46.	MD-LOT	09 January 2025: Scoping response	Hydrographic surveys should fulfil the requirements set out in Annex 4 of MGN 654.	As per Section 13.9 , there will be full MGN 654 compliance including in relation to hydrographic surveys.
47.	MD-LOT	09 January 2025: Scoping response	The MCA and NLB representations regarding the Design Specification and Layout Plan, Navigational Safety Plan and Lighting and Marking Plan should be addressed by the Developer in the EIA Report.	The DSLP and compliance with MGN 654 are included as mitigation, with the creation of an ERCoP also included (as per Section 13.9). As per Section 13.9 , an NSP and LMP are included as embedded mitigation.
48.	MD-LOT	09 January 2025: Scoping response	An assessment of the distances between the neighbouring offshore renewable project boundaries and shipping routes in line with MGN Standard 654 must be addressed in the EIA Report.	Cumulative developments have been screened based on criteria described in Appendix 13.1 Navigational Risk Assessment . A Cumulative Effects Assessment has been undertaken in Section 13.12 , which considers the distance between other infrastructure and vessel traffic in the area.
49.	MD-LOT	09 January 2025: Scoping response	The Scottish Ministers highlight the representation from the MCA, NLB, RYA and UKCoS regarding the Dubh Artach and Skerryvore lighthouse refurbishment work and	Cumulative impacts to Navigational safety relating to the Dubh Artach refurbishment



I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			general navigational safety and advise that this should be fully addressed in the EIA Report.	works have been included in the cumulative screening as per Section 13.12.2 .
50.	MD-LOT	09 January 2025: Scoping response	The Scottish Ministers note the representation from UKCoS which welcomes a study area of 50 nautical miles but adds that this must address transboundary effects and advise that this is considered within the EIA Report.	Transboundary effects are assessed within Section 13.13 .
51.	MD-LOT	09 January 2025: Scoping response	The Scottish Ministers direct the Developer to the representation from the RYA and advise that the additional documentation highlighted should be considered when assessing the impact on shipping and navigation from the Proposed Development.	As per Section 13.4 , the Marine Recreation and Tourism Survey maps are considered as a data source. The data sources used during the EIA process were presented during the Hazard Workshops, with no concerns raised. As per item 9, Northern Ireland recreational representatives were also invited to attend.
52.	Argyll and Bute Council	03 December 2024: Scoping response	NLB, Argyll and Bute Harbour Authority, and CMAL should be consulted with.	As per Section 13.3 , all stakeholders listed have been provided with the opportunity to comment.
53.	Argyll and Bute Council	03 December 2024: Scoping response	Confirmed content with legislation, policy and guidance followed; study area used for Shipping and Navigation; embedded mitigation measures; and identified potential impacts.	Acknowledged.
Post-Scoping Opinion				
54.	MCA	05 February 2025: Email	<p>"MCA can confirm that on this occasion it is content with the following datasets being used to inform the project EIA, in the event that submission occurs in Q2 2026:</p> <ul style="list-style-type: none"> • 14 days of AIS & Radar (December 2023); • 14 days of AIS & Radar (August 2024); • Six days of AIS & Radar (January 2025); and • 12 months of AIS (January 2025)." 	Acknowledged within Section 13.5 . These datasets have been used to inform Appendix 13.1 Navigational Risk Assessment and this chapter.
55.	NLB	30 April 2025: consultation meeting	Slings operations at the Dubh Artach lighthouse require a vessel and helicopter. The vessel requires 360° access	Acknowledged within Appendix 13.1 Navigational Risk Assessment , with site

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
			around the lighthouse to account for different positioning in certain weather conditions and is positioned a maximum of 1 nm from the lighthouse (closer for helicopter lifting operations). The safety zone around the vessel will need to be 1 nm to allow for helicopter operations, meaning slinging operations will require a 2 nm 360° clearance around the lighthouse.	reductions made to accommodate. NLB have confirmed they are content.
56.	Local WDA fisher	11 June 2025: local Hazard Workshop (Islay)	Vessel Monitoring System (VMS) data shown in the meeting does not fully represent the Islay fishing fleet as no fishing vessels located in Islay are over 15 metres (m).	In addition to AIS and VMS data, radar and visual observations have been considered within the primary vessel traffic datasets (see Section 5.2). Consultation input has also been accounted for.
57.	Local WDA fisher	11 June 2025: local Hazard Workshop (Islay)	Minimum structure separation distance would likely be sufficient for both transiting and fishing operations dependent on conditions.	Addressed within the risk assessment in Section 13.11 .
58.	Local WDA fisher	11 June 2025: local Hazard Workshop (Islay)	For six months of the year the local fishers undertake fishing operations every day.	Addressed within the vessel traffic baseline (see Section 13.8.1.3).
59.	Local WDA fisher	11 June 2025: local Hazard Workshop (Islay)	No concerns on collision risk in the sea area between the WDA and Colonsay are expected.	Acknowledged within the risk assessment in Section 13.11 .
60.	CFA	11 June 2025: local Hazard Workshop (Islay)	The Project should consider the layout in relation to helicopter SAR operations.	As per the mitigations presented in Section 13.9 , it will be ensured post-consent that the layout options will comply with MGN 654, including access/mobility for helicopters and further consultation to take place prior to final layout signoff
61.	NLB	11 June 2025: local Hazard Workshop (Islay)	All lighting requirements for the Project need to follow stringent and established lighting and marking protocols.	As noted within the mitigation measures (see Section 13.9), lighting and marking of the WDA and WDA infrastructure will be in agreement with NLB and in line with IALA O139 (IALA, 2021) and G1162 (IALA, 2022).



I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
62.	MCA	02 July 2025: mainland Hazard Workshop (Edinburgh)	The searoom to the east may not be suitable for vessels to deviate, and it will therefore be useful to apply corridor guidance here to investigate further	Site refinements have been made (see Appendix 13.1 Navigational Risk Assessment), with the MCA expressing contentment on the reductions (see 25 September 2025 entries).
63.	MCA	02 July 2025: mainland Hazard Workshop (Edinburgh)	No cumulative effects are expected from the Malin Sea and Malin Head offshore windfarms.	Acknowledged within Section 13.12 .
64.	MCA	02 July 2025: mainland Hazard Workshop (Edinburgh)	Reduced access to local ports should be included within the hazard log.	Reduction of access to local ports and harbours has been included within the hazard log in Appendix 13.1 Navigational Risk Assessment and assessed in Section 13.11 .
65.	RYA Scotland	02 July 2025: mainland Hazard Workshop (Edinburgh)	The possibility of buoys losing station and creating a hazard should be investigated, particularly due to the potential for adverse weather conditions in the area.	As will be included within the LMP, buoyage to be deployed will be placed after consultation with NLB. Buoys which will be in place will use tracking devices, with recovery plans to be implemented within the LMP. Impacts of construction buoyage losing station have been assessed within Section 13.11 .
66.	RYA Scotland	02 July 2025: mainland Hazard Workshop (Edinburgh)	Recreational vessels may find it more difficult to view the Dubh Artach lighthouse than other vessel types due to the relatively low height of recreational craft.	As per Appendix 13.1 Navigational Risk Assessment , site reductions in the north have been made to increase the distance between the Dubh Artach lighthouse and WTGs for the Project.
67.	RYA Scotland	02 July 2025: mainland Hazard Workshop (Edinburgh)	The recreational vessel tracks in the survey data and long-term data are as would be expected. Any vessels transiting from the Clyde are likely to go further east than the WDA.	Assessed within the future case scenario for recreational vessel traffic (Section 13.8.2).



I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
68.	RYA Scotland	02 July 2025: mainland Hazard Workshop (Edinburgh)	Those sailing in area will likely be competent sailors due to the local conditions.	Acknowledged within the risk assessment in Section 13.11 .
69.	RYA Scotland	02 July 2025: mainland Hazard Workshop (Edinburgh)	Incidences of larger vessels displaying as Restricted in Ability to Manoeuvre (RAM) have been observed due to shallow water depths. If this happens with Project vessels, it will constrict searoom even further.	Potential for RAM Project vessels to restrict searoom has been addressed within the risk assessment in Section 13.11 .
70.	UK Chamber of Shipping	02 July 2025: mainland Hazard Workshop (Edinburgh)	There is concern over the distance between the WDA and the coast to the east, with cargo vessels routeing north-south potentially required to deviate here. This will likely impact fishing vessels further inshore.	The WDA has been refined as per Appendix 13.1 Navigational Risk Assessment to allow for greater searoom.
71.	CalMac Ferries	02 July 2025: mainland Hazard Workshop (Edinburgh)	CalMac vessels only undertake 1-2 transits in the area per year, as most transits are further east. These vessels would transit inshore if required to deviate, as vessel Masters are comfortable at close to 1 nm from WTGs on larger vessels. This depends on the ports used by the Project.	CalMac vessel routeing patterns have been assessed within the risk assessment in Section 13.11 .
72.	CalMac Ferries	02 July 2025: mainland Hazard Workshop (Edinburgh)	In periods of inclement weather, vessels sheltering further inshore may impact on CalMac vessel routeing.	Potential impact on deviating CalMac vessels in periods of adverse weather has been assessed within the risk assessment in Section 13.11 .
73.	SWFPA	02 July 2025: mainland Hazard Workshop (Edinburgh)	Whether fishing vessels will continue to transit within the WDA depends on the orientation and size of the WTGs, as well as the vessel Master's discretion.	Acknowledged within the risk assessment in Section 13.11 .
74.	SWFPA	02 July 2025: mainland Hazard Workshop (Edinburgh)	If jacket foundations are used, they are typically towed by barges and present the greatest risk to damaging static fishing gear. There should be defined transit lanes, consideration of sheltered areas for larger vessels, and the Project's Vessel Management Plan (VMP) to be available on all Project vessels so vessel personnel are aware of appropriate procedures.	Associated content on vessel transit corridors and shelter areas is a standard inclusion requirement for VMP consent conditions. A VMP is included as embedded mitigation as per Section 13.9 . This will be promulgated to all vessel Masters on project vessels noting that abiding by the



I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
				requirements of COLREGs and SOLAS will remain the navigational priorities at all times.
75.	SWFPA	02 July 2025: mainland Hazard Workshop (Edinburgh)	In the event of a potential drifting collision, a fishing vessel Master would prioritise deploying anchor as quickly as possible, with primary concern on the collision as opposed to cable snagging.	Considered within the risk assessment in Section 13.11 .
76.	SWFPA	02 July 2025: mainland Hazard Workshop (Edinburgh)	Recreational vessels under sail in proximity to a WTG may experience wind shear, masking and turbulence.	Addressed within the risk assessment in Section 13.11 .
77.	DFDS	07 July 2025: consultation meeting	DFDS concerns are primarily commercial, although there are navigational concerns dependent on weather conditions. The decision of a vessel Master to transit inshore or offshore of the WDA would be dependent on weather conditions such as visibility and sea state, with vessels likely to transit inshore of the WDA during normal conditions. During periods of adverse weather, vessels will instead transit offshore to the west of the Project's WDA.	Likelihood of DFDS vessels to deviate offshore of the WDA during adverse weather highlighted in Appendix 13.1 Navigational Risk Assessment . DFDS have confirmed content with the WDA post refinement.
78.	DFDS	07 July 2025: consultation meeting	DFDS preference would be for the northeastern section of the WDA boundary to be refined so it is located further offshore from Colonsay. It would be preferable also for the northeastern section of the WDA boundary to be adjusted in a southwestern direction which would result in fewer necessary turns	As per Appendix 13.1 Navigational Risk Assessment , the northeast of the WDA has been refined with straighter edges. DFDS have confirmed they are content with the WDA post refinement.
79.	NLB	07 July 2025: consultation meeting	The distinction between the Project's WTG lighting arrangements and the Dubh Artach lighthouse lighting characteristics should be considered, with 3D reference visualisations of the Dubh Artach lighthouse requested to demonstrate the presence of the WTGs in relation to the lighthouse.	NLB were provided with 3D reference visuals of the Dubh Artach lighthouse in relation to the WDA infrastructure. As per item 66 of this table, NLB are content that impacts on the lighthouse as a significant Aid to Navigation in the area can be mitigated through discussions as part of the LMP.

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
80.	NLB	07 July 2025: consultation meeting	NLB has a preference for defined project boundaries and reducing the presence of isolated WTGs.	Site reductions have been made to further define the WDA boundary and reduce potential for isolated structures, as per Appendix 13.1 Navigational Risk Assessment .
81.	Port of Glensanda	14 July 2025: consultation meeting	Vessels transiting to Glensanda typically route through the Sound of Mull when arriving from Europe. All vessels routing to Glensanda are of sufficient draught to pass through the Sound of Mull. Glensanda receives 'approximately a hundred larger vessels' per year.	Addressed within the risk assessment in Section 13.11 .
82.	Port of Glensanda	14 July 2025: consultation meeting	The searoom between Colonsay and the eastern boundary of the WDA is sufficient for vessels transiting to Glensanda.	Suitability of vessels to transit between the WDA and the coast has been assessed within the risk assessment in Section 13.11 .
83.	DFDS	10 September 2025: consultation meeting	The DFDS route runs in a fixed line of service on a weekly schedule which would need to be amended, which could have cost implications.	Addressed within the risk assessment in Section 13.11 .
84.	DFDS	10 September 2025: consultation meeting	DFDS are appreciative of the refined RLB.	Acknowledged within discussions of the site refinement undertaken in Appendix 13.1 Navigational Risk Assessment .
85.	NLB and MCA	25 September 2025: consultation meeting	Content with the site refinement made, and appreciative of the further detail presented on searoom available to the east of the WDA as well as vessel numbers/sizes post-site refinement.	Acknowledged within the risk assessment in Section 13.11 .
86.	NLB and MCA	25 September 2025: consultation meeting	Suggested consulting with the Port of Glensanda on local water depths in the inshore area.	As per item 67 of this table, the Port of Glensanda have been consulted with regarding local water depths and did not raise any concerns following consultation with the Yeoman vessels
87.	UK Chamber of Shipping	25 September 2025: consultation meeting	Content with the site refinement made.	Noted.

I.D.	Consultee	Date/Engagement Activity	Stakeholder Comment	Applicant Response
88.	UK Chamber of Shipping	12 December 2025: email	Chamber of Shipping confirmed that DFDS are content with the WDA boundary as it has been amended.	Noted.
89.	Port of Glensanda	16 December 2025: consultation meeting	It is not believed that there will be excessive vessel encounters.	Addressed within the risk assessment in Section 13.11 .
90.	NLB	06 January 2026: email.	NLB are content that any impact on the Dubh Artach lighthouse as a significant Aid to Navigation in the area can be mitigated through discussions as part of the project LMP.	Addressed within the risk assessment in Section 13.11 .
91.	Port of Glensanda	29 January 2026: email.	No concerns were raised by vessel Masters on Yeoman-operated craft regarding the water depths in proximity to the WDA.	Addressed within the future case vessel traffic in Appendix 13.1 Navigational Risk Assessment .
92.	MCA	10 March 2026: email.	MCA are content with the updated shipping and navigation Study Area used in the NRA.	Noted, the agreed study area has been utilised.
93.	NLB	10 March 2026: email.	NLB are content with the updated shipping and navigation Study Area used in the NRA.	Noted, the agreed study area (WDA plus a 10 nm buffer) has been utilised.
94.	NLB, MCA, CAA	31 March 2026: MS Teams meeting	A summary of a study of wind farm lighting effects on ornithological receptors (storm petrels and shearwaters) was provided. NLB, MCA and CAA were content to discuss the outputs in further detail post consent noting no specific mitigation proposals are currently being put forward.	Should the Applicant seek to explore any potential mitigations of relevance to lighting and marking post consent, these will be discussed with NLB, MCA and CAA as part of the LMP process



Table 13.3 Summary of meetings relevant to shipping and navigation

ID	Consultee	Summary of Meeting
Pre-Scoping Opinion (2022 – 2024)		
1.	CMAL (2022)	The Applicant met with CMAL in October 2022 to introduce the Project and answer any initial queries. It was agreed that both parties should remain in contact through the development of the Project.
2.	MCA (2022, 2023, 2024)	The Applicant introduced the Project to the MCA during a meeting in April 2022 and provided an initial overview of the intended surveys to be undertaken. The Applicant continued to keep the MCA up to date with proposed survey works in addition to the deployment and removal of equipment. The Applicant also agreed a 'Notice of Intention to carry out an Exempted Activity' with the MCA for survey works that were undertaken later in 2022.
3.	NLB (2022, 2023, 2024)	The Applicant introduced the Project to the NLB during a meeting in April 2022 and discussed the programme for planned survey activities within the vicinity of the Dubh Artach lighthouse. The Applicant continued to keep the NLB up to date with proposed survey works in addition to the deployment and removal of equipment.
Post-Scoping Opinion (2025)		
4.	MCA (2025)	The Applicant continued to keep the MCA up to date with proposed survey works in addition to the deployment and removal of equipment, as well as in discussions regarding the site refinement undertaken as a response to stakeholder feedback.
5.	NLB (2025)	The Applicant met with the NLB to discuss the outputs of the mainland Hazard Workshop, as well as the site refinement undertaken as a response to stakeholder feedback.
6.	CMAL (2025)	The Applicant met with CMAL to discuss progress on Port Ellen, with acknowledgment that the Applicant will liaise with the port in relation to the potential for Port Ellen to be used as a marine operations base during the construction phase of the Project.
7.	DFDS (2025)	The Applicant met with DFDS to discuss site refinement works, particularly those undertaken in the east of the WDA, in relation to previous feedback on DFDS vessel routeing in the area.
8.	UK Chamber of Shipping (2025)	The Applicant met with the UK Chamber of Shipping to discuss the site refinement undertaken as a response to stakeholder feedback.
9.	Port of Glensanda (2025)	The Applicant met with the Port of Glensanda to provide an overview and output of the Hazard Workshops, and to discuss site refinement of the WDA in relation to Glensanda vessels routeing. The Project also visited Glensanda, in order to better understand shipping routes close to the Project, as well as to discuss potential future developments relating to Glensanda.



ID	Consultee	Summary of Meeting
10.	Local Hazard Workshop (2025)	A local hazard workshop was held in Bowmore, Islay with a hybrid set up, attended by small-craft users such as fishers and recreational marine users, in addition to the NLB and CFA. This engagement enabled the Applicant to gather and discuss expert opinion and local knowledge to incorporate into the risk assessment, ensuring the hazard log was site-specific.
11.	Mainland Hazard Workshop	A mainland hazard workshop was held in Edinburgh with a hybrid set up, attended by fisheries representatives (SFF, SWFPA, CFA, SWCRIFG), CalMac Ferries, UK Chamber of Shipping, MCA and RYA Scotland. This engagement enabled the Applicant to gather and discuss expert opinion and local knowledge to incorporate into the risk assessment, ensuring the hazard log was site-specific.



13.4 EXISTING DATA SOURCES

15. **Table 13.4** sets out the information and data sources that have been used to inform this chapter.

Table 13.4 Summary of key datasets and information sources

Dataset	Description	Citation
ShipRoutes	Anatec’s ShipRoutes database	Anatec, 2025
AIS-only long-term vessel traffic dataset	Long-term AIS data for the shipping and navigation Study Area (12 months, March 2024 to February 2025) recorded from terrestrial and satellite receivers.	Anatec, 2025
MAIB marine accidents database (2005 to 2024).	Maritime incident data including the locations and details of all MAIB reported incidents.	MAIB, 2025.
Royal National Lifeboat Institution (RNLI) incident data (2015 to 2024).	Maritime incident data including the locations and details of all RNLI reported incidents.	RNLI, 2025.
Department for Transport (DfT) UK civilian SAR helicopter taskings (April 2015 to March 2025).	Maritime incident data including the locations and details of all UK civilian SAR helicopter taskings.	DfT, 2025.
United Kingdom Hydrographic Office (UKHO) Admiralty charts	Navigational features in the area covered in Admiralty charts 2635, 2723, and 2724	UKHO, 2025.
Admiralty Sailing Directions	Navigational features and visibility data within the area covered in Admiralty Sailing Directions South-West Coast of Scotland Pilot NP66A	UKHO, 2023.

13.5 SITE-SPECIFIC SURVEY DATA

16. In addition to the existing data sources identified in (**Section 13.4**), the Project has undertaken site-specific surveys to inform the EIA (**Table 13.5**).

Table 13.5 Site-specific survey data

Dataset	Year(s)	Description
Projects Metocean Survey	2023 to 2025	<p>A wind resource and metocean measurement campaign was undertaken by the Project. A Metocean Midi Buoy, Seabed Lander and Floating Light Detection and Ranging (LiDAR) Buoy were deployed for two years from 2023 to 2025 within the OAA to measure:</p> <ul style="list-style-type: none"> • Wind profile up to 300 m (speed and direction); • Wind data at 4 m (speed and direction); • Wave parameters (height, period, direction); • Current profile (speed and direction); and • Water level.

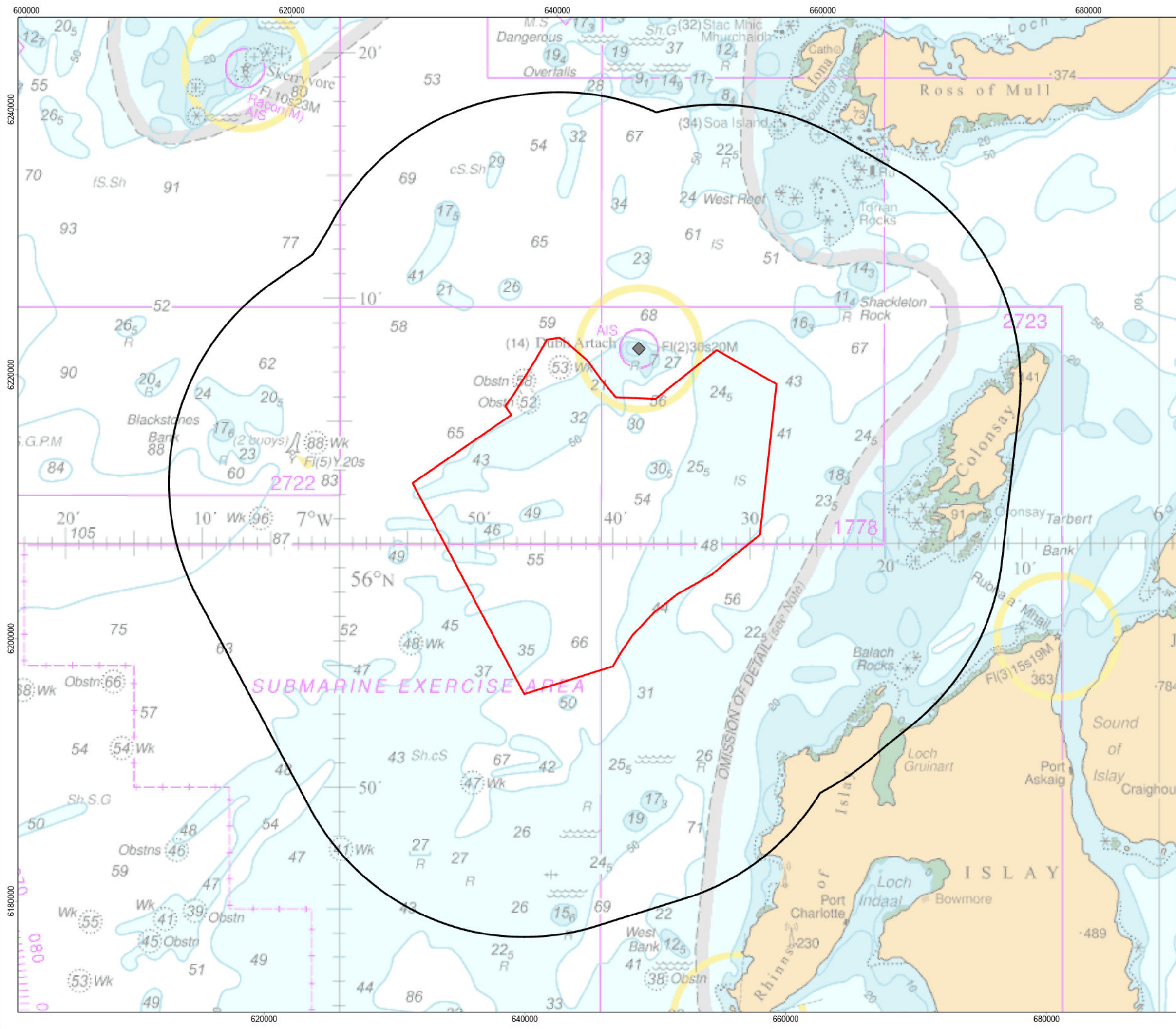


Dataset	Year(s)	Description
Winter Vessel Traffic Survey	2023	<p>A Vessel Traffic Survey undertaken by the Project across the full WDA, plus a 10 nm buffer, consisting of:</p> <ul style="list-style-type: none"> • AIS; • Radar; and • Visual observations. <p>This survey was undertaken from 01 to 16 December 2023.</p>
Summer Vessel Traffic Survey	2024	<p>A Vessel Traffic Survey undertaken by the Project across the WDA, plus a 10 nm buffer, consisting of:</p> <ul style="list-style-type: none"> • AIS; • Radar; and • Visual observations. <p>This survey was undertaken from 16 August to 01 September 2024.</p>
Supplementary Winter Vessel Traffic Survey	2025	<p>A Vessel Traffic Survey undertaken by the Project across the WDA, plus a 10 nm buffer, consisting of:</p> <ul style="list-style-type: none"> • AIS; • Radar; and • Visual observations. <p>This survey was undertaken from 20 to 30 January 2025. Although the survey was unable to continue past 30 January 2025 due to adverse weather, the vessel traffic data has been used as validation throughout the Shipping and Navigation assessment. Noting that a full 14-day period of vessel traffic was not surveyed, the vessel traffic from the winter 2023 vessel traffic survey is used instead as a primary data source.</p>

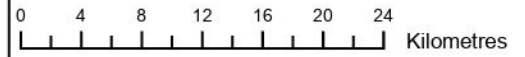
13.6 SHIPPING AND NAVIGATION STUDY AREA

17. The WDA plus a 10 nm buffer (the ‘shipping and navigation Study Area’) has been considered for assessment of baseline vessel traffic within and in proximity to the Project. This is standard industry practice and is considered sufficient to capture relevant vessel routing within the area whilst remaining site-specific and has also been presented to key maritime stakeholders including at the Hazard Workshops. An overview of the shipping and navigation Study Area is presented in **Figure 13.1**.





- Windfarm Development Area
- Shipping and Navigation Study Area
- Dubh Artach Lighthouse



2	20/02/2026	DS	IK	AF	AF
REV	DATE	CREATOR	REVIEWER	CHECKER	APPROVER

DRAWING NUMBER: MCW-DWF-ENV-MAP-RHS-000164

DATUM	WGS84	PROJECTION	Mercator
SCALE	1:500,000	PAGE SIZE	A3

PROJECT TITLE: MachairWind

DRAWING TITLE: **Figure 13.1: Overview of the Shipping and Navigation Study Area**

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13.7 REALISTIC WORST-CASE SCENARIOS

18. The final design of the WDA will be confirmed by detailed engineering studies post-consent. To undertake a robust and precautionary impact assessment, the realistic worst-case design scenarios (i.e., those that would cause the greatest impact) are defined from the Project Design Envelope; ensuring that all other design scenarios would have equal or less impact. Please see **Chapter 5 EIA Methodology** for further details on the design envelope approach.
19. The realistic worst-case scenarios (and associated impacts scoped in for assessment in the Scoping Report) for the shipping and navigation assessment are summarised in **Table 13.6** below. These are based on the project design as described in **Chapter 3 Project Description**.



Table 13.6 Realistic worst-case scenarios for impacts on shipping and navigation

Impact	Realistic Worst-Case Scenario	Rationale
Construction		
Vessel displacement and increased third-party vessel-to-vessel collision risk	<ul style="list-style-type: none"> • Maximum extent of buoyed construction area assuming full build out of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Construction phase of up to five years; • 500 m safety zones around structures where active construction is ongoing, 50 m safety zones otherwise; • 309 nm (572 kilometres (km)) of IACs; • 108 nm (200 km) of the offshore export cable(s) within the WDA; and • 147 nm (272 km) of OSP link cables. 	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement and subsequent collision risk involving third-party vessels.
Increased third-party vessel to project vessel collision risk	<ul style="list-style-type: none"> • Maximum extent of buoyed construction area assuming full build out of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Construction phase of up to five years; • Up to 1,140 return trips per year from project vessels, with up to 117 project vessels on site at any one time; • 108 nm (200 km) of the offshore export cable(s) within the WDA; and • 147 nm (272 km) of OSP link cables. 	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel-to-vessel collision risk involving a third-party vessel and a project vessel.
Reduced access to local ports and harbours	<ul style="list-style-type: none"> • Maximum extent of buoyed construction area assuming full build out of the WDA; and • Up to 1,140 return trips per year from project vessels, with up to 117 project vessels on site at any one time. 	Greatest number of simultaneous vessel activities resulting in the maximum spatial and temporal effect on access to local ports and harbours.
Reduction of emergency response capability	<ul style="list-style-type: none"> • Maximum extent of buoyed construction area assuming full build out of the WDA; • 144 WTGs and two OSPs within the WDA; 	Largest possible extent, greatest number of surface structures, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum



Impact	Realistic Worst-Case Scenario	Rationale
	<ul style="list-style-type: none"> • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Construction phase of up to five years; • Up to 1,140 return trips per year from project vessels with up to 117 project vessels on site at any one time; and • 500 m safety zones around structures where active construction is ongoing, 50 m safety zones otherwise. 	spatial and temporal effect on emergency response capability.
Vessel-to-structure allision risk	<ul style="list-style-type: none"> • Maximum extent of buoyed construction area assuming full build out of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Construction phase of up to five years; • 500 m safety zones around structures where active construction is ongoing, 50 m safety zones otherwise; • WTG jacket dimensions of 37 m x 35 m at sea surface; • OSP topside dimensions of 125 m x 120 m; and • Minimum WTG spacing of 944 m. 	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.
Operation and Maintenance		
Vessel displacement and increased third-party vessel-to-vessel collision risk	<ul style="list-style-type: none"> • Maximum extent of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Operational phase of up to 35 years; • 500 m safety zones around major maintenance; • 309 nm (572 km) of IACs; • 108 nm (200 km) of the offshore export cable(s) within the WDA; and • 147 nm (272 km) of OSP link cables. 	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement and subsequent collision risk involving third-party vessels.
Increased third-party vessel to project vessel collision risk	<ul style="list-style-type: none"> • Maximum extent of the WDA; • 144 WTGs and two OSPs within the WDA; 	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on

Impact	Realistic Worst-Case Scenario	Rationale
	<ul style="list-style-type: none"> • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Operational phase of up to 35 years; • Up to 423 return trips per year from project vessels; • 108 nm (200 km) of the offshore export cable(s) within the WDA; and • 147 nm (272 km) of OSP link cables. 	vessel-to-vessel collision risk involving a third-party vessel and a project vessel.
Vessel-to-structure allision risk	<ul style="list-style-type: none"> • Maximum extent of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Operational phase of up to 35 years; • 500 m safety zones around major maintenance; • WTG jacket dimensions of 37 m x 35 m at sea surface; • OSP topside dimensions of 125 m x 120 m; and • Minimum WTG spacing of 944 m. 	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 access to local ports and harbours	<ul style="list-style-type: none"> • Maximum extent of the WDA; and • Up to 423 return trips per year from project vessels. 	Greatest number of simultaneous vessel activities resulting in the maximum spatial and temporal effect on access to local ports and harbours.
Reduction of under keel clearance	<ul style="list-style-type: none"> • Maximum extent of the WDA; • 144 WTGs and two OSPs within the WDA; • Operational phase of up to 35 years; • 309 nm (572 km) of IACs; • Maximum IAC protection height of 3 m, with 0.1% of the IACs requiring protection; • No inter-array crossings; • 108 nm (200 km) of offshore export cable(s) within the WDA; and • 147 nm (272 km) of OSP link cables. 	Maximum length of subsea cable and maximum extent of protection leading to greatest under keel interaction risk.
Anchor interaction with subsea cables	<ul style="list-style-type: none"> • Maximum extent of the WDA; • 144 WTGs and two OSPs within the WDA; • Operational phase of up to 35 years; 	Largest possible extent of subsea infrastructure and greatest duration resulting in the maximum spatial and



Impact	Realistic Worst-Case Scenario	Rationale
	<ul style="list-style-type: none"> • 309 nm (572 km) of IACs; • Maximum cable protection height of 3 m. • No inter-array crossings; • 108 nm (200 km) of offshore export cable(s) within the WDA; • 147 nm (272 km) of OSP link cables; and • Minimum target burial depth for IACs of 0.3 m, and 1m for the OSP link and export cable(s). 	temporal effect on anchor or fishing gear interaction with subsea cables.
Reduction of emergency response capability	<ul style="list-style-type: none"> • Maximum extent of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Operational phase of up to 35 years; • Minimum WTG spacing of 944 m; and • Up to 423 return trips per year from project vessels. 	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 and increased third-party vessel-to-vessel collision risk	<ul style="list-style-type: none"> • Maximum extent of buoyed decommissioning area assuming full build out of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Decommissioning phase of up to five years; • 500 m safety zones around structures where active decommissioning is ongoing, 50 m safety zones otherwise; • 309 nm (572 km) of IACs; • 108 nm (200 km) of offshore export cable(s) within the WDA; and • 147 nm (272 km) of OSP link cables. 	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement and subsequent collision risk involving third-party vessels.
Increased third-party vessel to project vessel collision risk	<ul style="list-style-type: none"> • Maximum extent of buoyed decommissioning area assuming full build out of the WDA; • 144 WTGs and two OSPs within the WDA; 	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on



Impact	Realistic Worst-Case Scenario	Rationale
	<ul style="list-style-type: none"> • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Decommissioning phase of up to five years; • Up to 1,140 return trips per year from project vessels, with up to 117 project vessels on site at any one time. • 309 nm (572 km) of IACs; • 108 nm (200 km) of the offshore export cable(s) within the WDA; and • 147 nm (272 km) of OSP link cables. 	vessel-to-vessel collision risk involving a third-party vessel and a project vessel.
Reduced access to local ports and harbours	<ul style="list-style-type: none"> • Maximum extent of the WDA; and • Up to 1,140 return trips per year from project vessels, with up to 117 project vessels on site at any one time. 	Greatest number of simultaneous vessel activities resulting in the maximum spatial and temporal effect on access to local ports and harbours.
Reduction of emergency response capability	<ul style="list-style-type: none"> • Maximum extent of buoyed decommissioning area assuming full build out of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Decommissioning phase of up to five years; and • 500 m safety zones around structures where active decommissioning is ongoing, 50 m safety zones otherwise. 	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.
Vessel-to-structure collision risk	<ul style="list-style-type: none"> • Maximum extent of buoyed decommissioning area assuming full build out of the WDA; • 144 WTGs and two OSPs within the WDA; • Structure locations as per Appendix 13.1 Navigational Risk Assessment; • Decommissioning phase of up to five years; • 500 m safety zones around structures where active decommissioning is ongoing, 50 m safety zones otherwise; • WTG jacket dimensions of 37 m x 35 m at sea surface; • OSP topside dimensions of 125 m x 120 m; and • Minimum WTG spacing of 944 m. 	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 collision risk.



13.8 EXISTING ENVIRONMENT

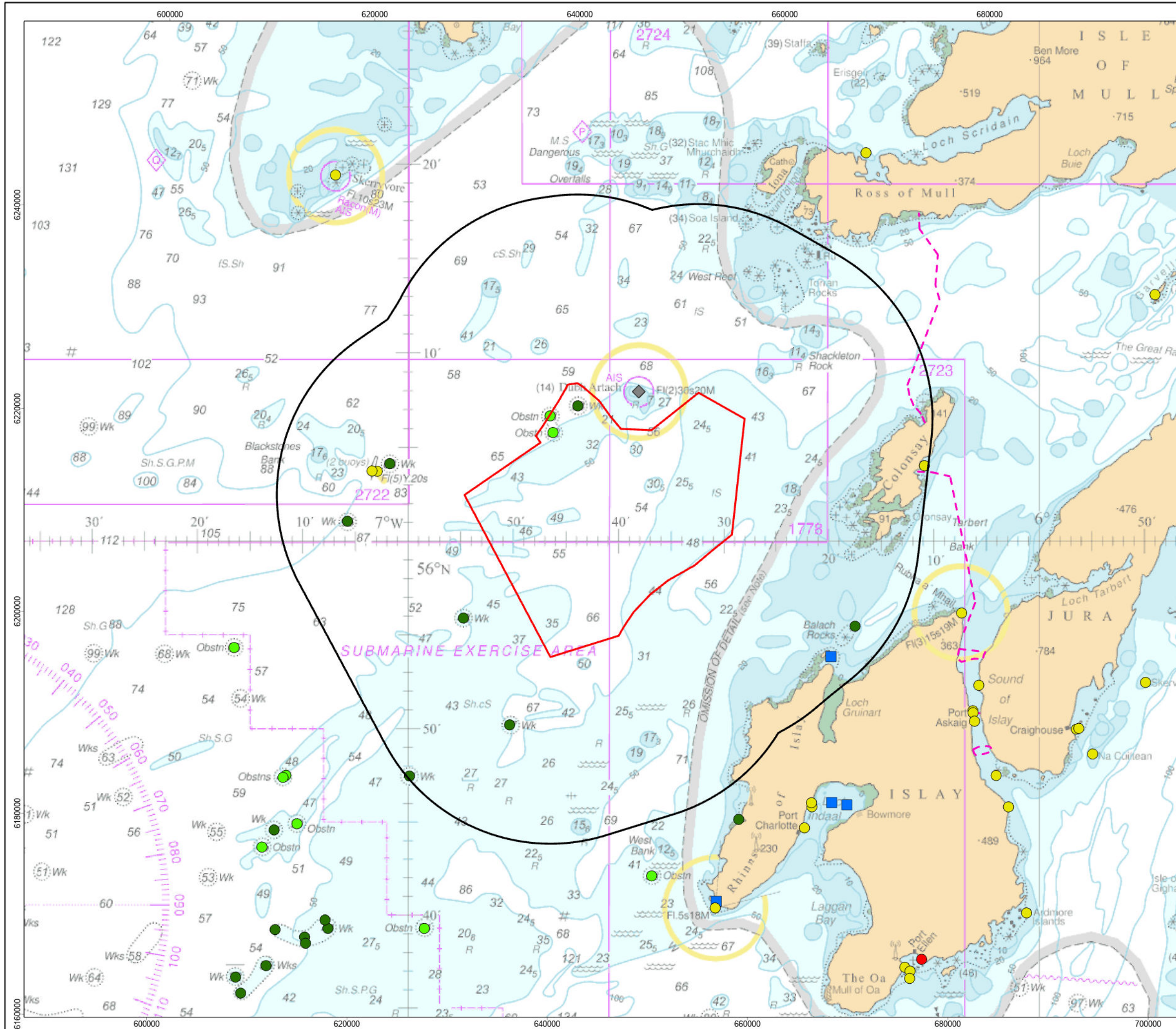
20. This section outlines the existing environment relative to the Project, with consideration given to navigational features, maritime incidents, and vessel traffic data in proximity to the WDA. The existing environment is described in full in **Appendix 13.1 Navigational Risk Assessment**.

13.8.1 Existing Baseline

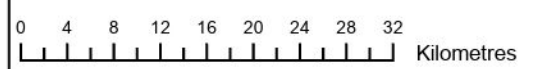
13.8.1.1 Navigational Features

21. Navigational features identified in proximity to the WDA are presented in **Figure 13.2**.
22. There are no key aids to navigation located within the WDA. However, the Dubh Artach lighthouse is located in proximity to the northern portion of the WDA approximately 2 nm from the boundary following site refinement, and is equipped with AIS. The aid to navigation on the Dubh Artach lighthouse is at a height of 44 m, flashes twice every 30 seconds, and has a range of 20 nm. Other notable key aids to navigation in the vicinity of the WDA include two buoys approximately 5 nm to the west (one of which is a special mark), and a pillar buoy equipped with AIS approximately 9 nm to the southeast.
23. One charted wreck is located within the WDA, in the north. This lies at a depth of 53 m below CD. Two charted obstructions are noted within the WDA, again within its northern portion. These are at a depth of 52 m and 58 m below CD. Not all wrecks are charted; further details of non-charted wrecks are provided in **Chapter 14 Offshore Archaeology and Cultural Heritage**.
24. A single preferred anchorage location is located in proximity to the WDA, approximately 8.5 nm to the southeast at the entrance to Loch Gruinart (inshore of Nave Island). In addition, two preferred anchorages are located in the bay within the west of Islay, approximately 14.5 nm southeast of the WDA.
25. Two subsea cables connect to the Island of Colonsay (inshore of the WDA), with one connecting to the Isle of Mull to the north (8.8 nm east of the WDA) and the other connecting to Islay to the south (9.3 nm east).
26. The closest port or harbour to the Project is Port Ellen on Islay, located approximately 24 nm to the southeast of the WDA, though it lies on the southern side of the island. A ferry terminal is present at Scalascaig, on the eastern side of Colonsay, approximately 9.6 nm east of the WDA. The Port of Glensanda is an important hub in the area located approximately 40 nm to the northeast of the WDA and, as per consultation (**Section 13.3**) and vessel traffic routeing observed (**Section 13.8.1.3**), serves as the origin and terminus port for bulk carriers related to the proximal quarry.





- Windfarm Development Area
- Shipping and Navigation Study Area
- Navigational Features**
- ◆ Dubh Artach Lighthouse
- Key Aid to Navigation
- Charted Obstruction
- Charted Wreck
- Port
- Preferred Anchorage
- Subsea Cable



2	20/02/2026	DS	IK	AF	AF
REV	DATE	GIS CREATOR	GIS REVIEWER	TECHNICAL CHECKER	TECHNICAL APPROVER

DRAWING NUMBER: MCW-DWF-ENV-MAP-RHS-000165

DATUM	WGS84	PROJECTION	Mercator
SCALE	1:650,000	PAGE SIZE	A3

PROJECT TITLE: MachairWind

DRAWING TITLE: **Figure 13.2: Navigational Features in Proximity to the WDA**

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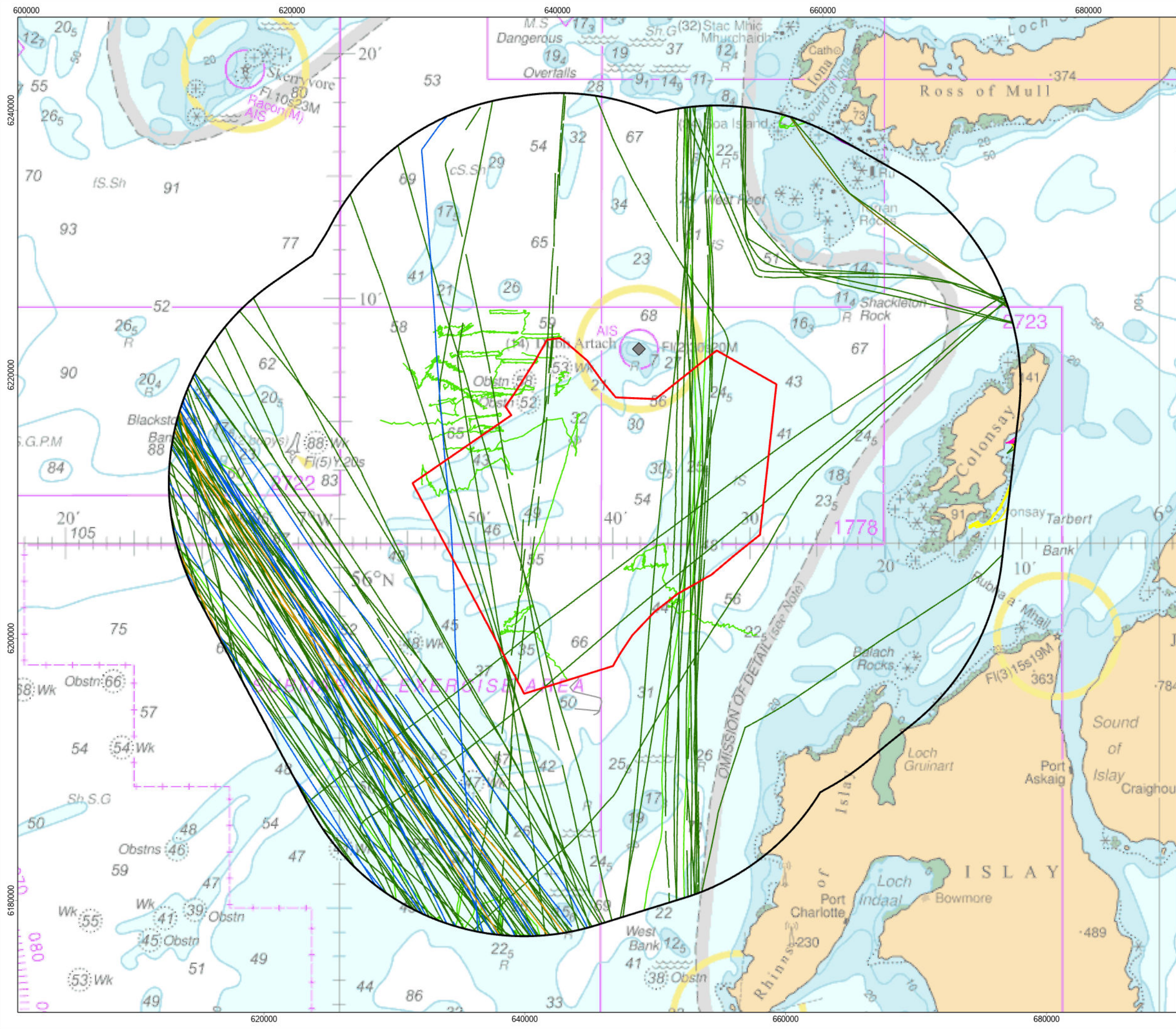
13.8.1.2 Historical Maritime Incidents

27. There were a total of 25 unique SAR helicopter taskings undertaken for incidents within the shipping and navigation Study Area between April 2015 and March 2025, corresponding to an average of two to three taskings per year. The majority of these taskings were 'rescue/recovery' (60%), with 'support' taskings (28%) also frequently noted. The taskings primarily related to incidents on Colonsay, with few recorded offshore of the WDA.
28. The closest RNLI station to the WDA is at Islay, approximately 16 nm to the southwest. There were a total of 20 recorded RNLI responses to 20 unique incidents within the shipping and navigation Study Area from 2015 to 2024, corresponding to an average of two incidents per year. The majority of incidents were inshore of the WDA. The majority of incident types within the shipping and navigation Study Area were 'machinery failure' (65%). Other than 'other' with two incidents, all other incident types recorded a single instance. The most frequently-recorded casualty types within the shipping and navigation Study Area were fishing (44%) and recreational (30%). Two incidents were recorded within the WDA itself, both related to a fishing vessel undergoing machinery failure. The majority of the incidents were responded to by the Islay RNLI station (74%), with the Oban station (22%) and the Tobermory station (one instance) also utilised.
29. There were a total of 13 unique incidents recorded by the MAIB within the shipping and navigation Study Area from 2015 to 2024, corresponding to an average of one incident per year. Of the incidents within the shipping and navigation Study Area, the most frequent incident type was 'machinery failure' (45%), with 'accident to person' and 'grounding/stranding' (18% each) also commonly noted. The majority of incidents involved fishing vessels (64%), with passenger vessels (18%) also frequently seen. One incident was recorded within the WDA itself, related to a fishing vessel undergoing machinery failure.
30. A review of older MAIB incident data within the shipping and navigation Study Area between 2005 and 2014 indicates that the number of incidents has decreased in proximity to the WDA, with a total of 15 incidents within the shipping and navigation Study Area recorded. Three incidents occurred within the WDA itself – a person overboard a fishing vessel, a fishing vessel with machinery failure, and a recreational vessel collision (noting that no further details on this collision, including the second vessel involved, are available).

13.8.1.3 Vessel Traffic Data

31. **Figure 13.3** and **Figure 13.4** present the vessel traffic data recorded during the 14 day winter 2023 survey period and 14 day summer 2024 survey period respectively, colour-coded by vessel type. Temporary traffic has been excluded from the figures and subsequent analysis to focus on routine vessel activities.





Windfarm Development Area
 Shipping and Navigation Study Area
 Dubh Artach Lighthouse

Vessel Type

- Unspecified
- Fishing
- Tug
- Passenger
- Cargo
- Tanker
- Other
- Recreational
- Oil and Gas

N
↑

0 4 8 12 16 20 24
Kilometres



2	20/02/2026	DS	IK	AF	AF
REV	DATE	CREATOR	REVIEWER	CHECKER	APPROVER

DRAWING NUMBER	MCW-DWF-ENV-MAP-RHS-000166		
DATUM	WGS84	PROJECTION	Mercator
SCALE	1:500,000	PAGE SIZE	A3

PROJECT TITLE: MachairWind

DRAWING TITLE Figure 13.3: 14 Days of Vessel Traffic Data by Vessel Type within the Shipping and Navigation Study Area (Winter 2023)

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Windfarm Development Area
 Shipping and Navigation Study Area
 Dubh Artach Lighthouse

Vessel Type

- Unspecified
- Fishing
- Military
- Tug
- Passenger
- Cargo
- Tanker
- Other
- Recreational
- Oil and Gas

0 4 8 12 16 20 24 Kilometres



2	20/02/2026	DS	IK	AF	AF
REV	DATE	CREATOR	REVIEWER	CHECKER	APPROVER

DRAWING NUMBER	MCW-DWF-ENV-MAP-RHS-000167			
DATUM	WGS84	PROJECTION	Mercator	
SCALE	1:500,000	PAGE SIZE	A3	
PROJECT TITLE	MachairWind			

DRAWING TITLE Figure 13.4: 14 Days of Vessel Traffic Data by Vessel Type within the Shipping and Navigation Study Area (Summer 2024)

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Haskoning
 Enhancing Society Together

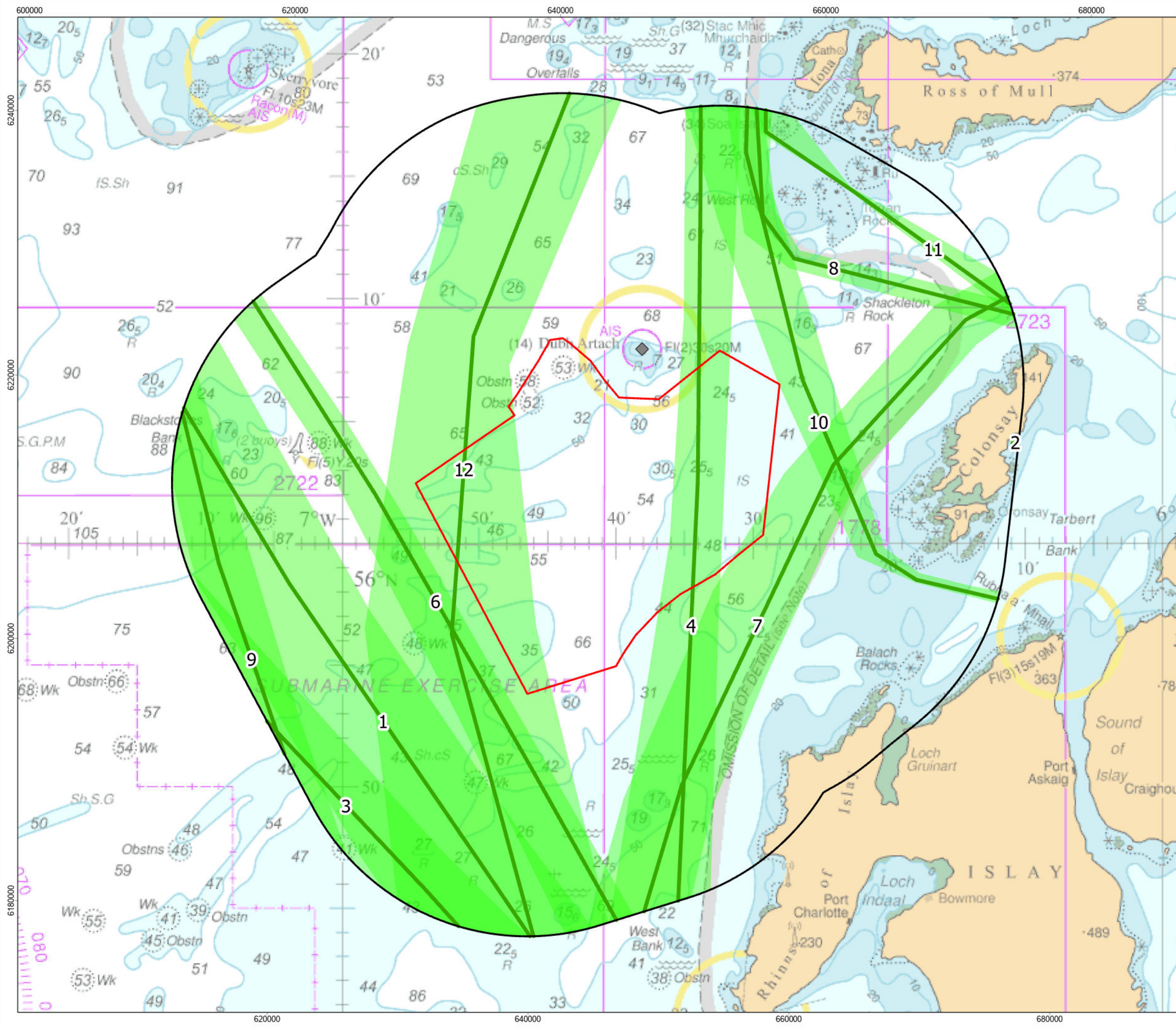
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32. During the winter survey period there was an average of ten to eleven unique vessels recorded within the shipping and navigation Study Area per day, with an average of two to three unique vessels per day recorded to intersect the WDA itself. The busiest days recorded within the shipping and navigation Study Area during the winter survey period, were 02, 08, and 11 December 2023, on which 14 unique vessels were recorded each. The busiest days recorded within the WDA itself during the winter survey period were 08 and 12 December 2023, on which five unique vessels were recorded.
33. During the summer survey period there was an average of 11 unique vessels recorded within the shipping and navigation Study Area per day, with an average of two unique vessels per day recorded to intersect the WDA itself. The busiest day recorded within the shipping and navigation Study Area during the summer survey period, was 31 August 2024, on which 23 unique vessels were recorded. The busiest day recorded within the WDA itself during the summer survey period was also 31 August 2024, on which six unique vessels were recorded.
34. During the winter survey period, the main vessel types within the shipping and navigation Study Area were cargo vessels (62%), fishing vessels (12%), and tankers (11%). During the summer survey period, the main vessel types within the shipping and navigation Study Area were cargo vessels (36%), passenger vessels (20%) and fishing vessels (14%).
35. A cargo vessel route on a north/south bearing in the east of the WDA was observed, with this including transit from a vessel owned by Godby Shipping and chartered by DFDS on a circular passage between Skogn (Norway), Belfast (UK), and Greenock (UK). One of these cycles was noted during the summer survey period (with additional cycles including use of a second vessel recorded in the long-term dataset). Other vessels routeing inshore included those transiting to Glensanda and other UK west coast ports, as well as vessels associated with fish farms on the west coast of Scotland. No regularly scheduled Roll-on/Roll-off cargo vessel routeing was recorded.
36. The vast majority of passenger vessel transits were contained to the eastern extremity of the shipping and navigation Study Area and involved regularly scheduled CalMac Roll-on/Roll-off passenger vessel routeing between Colonsay and Oban/Islay (UK). Due to the location of these tracks, it is not expected that they will be impacted by the Project.
37. Fishing vessels operating below 6 knots (kt) were observed primarily in the northwest of the shipping and navigation Study Area, with tracks also recorded to the south, as well within the southeast of the WDA.
38. The majority of recreational vessels were noted inshore of Colonsay, with several tracks on north-south passage through the WDA. Within the long-term dataset, a number of tracks were likely associated with two recreational races occurring around the coast, including a leg of the Clipper Round the World Yacht Race. These vessels transited between the US and Oban.
39. The average length of vessels within the shipping and navigation Study Area was 95 m. Over the survey periods, vessel length ranged from 7 m for a fishing vessel to 330 m for a cruise liner.
40. The average draught of vessels within the shipping and navigation Study Area was 5.5 m. Over the survey periods, vessel draught ranged from 1.5 m for a coastal tour vessel to 18.1 m for a bulk carrier.
41. Main commercial routes have been identified using the principles set out in MGN 654 (MCA, 2021). Vessel traffic data is assessed and vessels transiting at similar headings and locations are identified as a main route. To help identify main routes, vessel traffic data is also interrogated to show vessels (by name and/or operator) that frequently transit those routes. The route width is then calculated using the 90th percentile rule from the mean position of the potential shipping route.

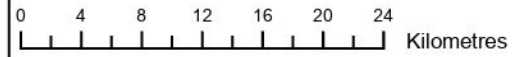


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42. A total of 12 main commercial routes within the shipping and navigation Study Area were identified from the vessel traffic survey data, in combination with Anatec's ShipRoutes database. These main commercial routes and corresponding 90th percentiles within the shipping and navigation Study Area are shown relative to the WDA in **Figure 13.5**. A description of each route is provided in **Table 13.7**, including the average number of vessels per day, start and end locations, main vessel types and details of commercial ferry routeing (where applicable). It is noted that the start and end locations are based on the most common destinations transmitted via AIS by vessels on these routes.





- Windfarm Development Area
- Shipping and Navigation Study Area
- Dubh Artach Lighthouse
- Base Case
- Mean Route Position
- 90th Percentile



2	20/02/2026	DS	IK	AF	AF
REV	DATE	GIS CREATOR	GIS REVIEWER	TECHNICAL CHECKER	TECHNICAL APPROVER

DRAWING NUMBER MCW-DWF-ENV-MAP-RHS-000168

DATUM WGS84 PROJECTION Mercator

SCALE 1:500,000 PAGE SIZE A3

PROJECT TITLE MachairWind

DRAWING TITLE **Figure 13.5: Base Case Main Commercial Routes within the Shipping and Navigation Study Area**

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NOT TO BE USED FOR NAVIGATION



Table 13.7 Description of base case main commercial routes within the shipping and navigation Study Area

Route Number	Average Vessels per Day	Average Vessels per Week	Description
1	3-4	24	Belfast – Russia/Scandinavia. Composed primarily of cargo vessels (70%) and tankers (23%).
2	1	6	Oban – Colonsay. Composed primarily of passenger vessels (88%).
3	1	5-6	Belfast – Icelandic ports. Composed primarily of cargo vessels (50%), tankers (32%), and passenger vessels (14%).
4	0-1	4	Irish ports – Norwegian ports. Composed primarily of cargo vessels (82%). Includes regularly scheduled DFDS vessels routeing between Skogn, Belfast, and Greenock.
5	0-1	3-4	Colonsay – Port Askaig. Composed of cargo vessels (39%), passenger vessels (39%), and tankers (22%).
6	0-1	3	Belfast – Swedish ports. Composed primarily of cargo vessels (89%).
7	0-1	1-2	Oban – Liverpool (UK). Composed primarily of cargo vessels (70%) and passenger vessels (24%).
8	0-1	1-2	Mallaig (UK) – Firth of Clyde (UK). Composed primarily of cargo vessels (95%).
9	0-1	1-2	Derry (UK) – Norwegian ports. Composed primarily of cargo vessels (77%) and passenger vessels (19%).
10	0-1	1	Campbeltown (UK) – Northwest Scottish ports. Composed primarily of cargo vessels (81%) and passenger vessels (11%).
11	0-1	1	Colonsay – West Scottish ports. Composed primarily of cargo vessels (55%) and fish farm vessels (26%).
12	0-1	1	North Channel – Norwegian ports. Composed primarily of cargo vessels (76%) and passenger vessels (20%).

13.8.2 Predicted Future Baseline

43. The EIA Regulations require the following to be included within the EIAR: “a description of the relevant aspects of the current state of the environment (the “baseline scenario”) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of relevant information and scientific knowledge.”
44. In the event that the Project does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.
45. 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, two independent scenarios of possible growth in commercial vessel movements of 10% and 20% have been estimated throughout the lifetime the Project, in line with best practice. These scenarios have been included in the quantitative modelling undertaken within **Appendix 13.1 Navigational Risk Assessment**. Due to the lack of operational or planned offshore developments in the vicinity of the



WDA, it is unlikely that commercial vessels will be required to deviate to avoid any other future offshore windfarm developments that are under construction or in operation.

- 46. Fluctuations in windfarm vessel activity will depend on future development and/or decommissioning, which again is heavily dependent on market conditions. Although this is difficult to predict, due to the low number of current/planned offshore wind developments in the region (as per **Section 13.12.2**, only Malin Sea Offshore Windfarm is planned within 50 nm of the WDA), it is unlikely that windfarm vessel numbers will increase past the base case values recorded.
- 47. There is also 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 can be made. There are no known major developments which would increase commercial fishing or recreational vessel activity in the region. Therefore, a conservative potential growth in commercial fishing vessel and recreational vessel movements of 10% and 20% has been estimated throughout the lifetime of the Project. Changes in commercial fishing activity are considered further in **Chapter 12 Commercial Fisheries**.

13.8.3 Data Limitations and Assumptions

- 48. 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.
- 49. 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 of 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.
- 50. The RNLI incident data cannot be considered comprehensive of all incidents in the Study Area. Although hoaxes and false alarms are excluded, any incident to which an RNLI resource was not mobilised has not been accounted for in this dataset.
- 51. 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 aids to navigation, only those charted and considered key to establishing the shipping and navigation baseline are shown.
- 52. 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.

13.9 EMBEDDED MITIGATION

- 53. This section outlines the embedded mitigation relevant to the shipping and navigation assessment (as shown in **Table 13.8** below). Where additional mitigation measures are required to mitigate potentially significant effects (in EIA terms), these are detailed in the impact assessment.

Table 13.8 Embedded mitigation measures for shipping and navigation

ID	Parameter	Description of Mitigation Measure	Securing Mechanism
M-7	Marine Pollution Contingency Plan	Development of, and adherence to, a Marine Pollution Contingency Plan (MPCP). The MPCP will provide guidance to the Project personnel, contractors and subcontractors on the	Section 36 and marine licence consent conditions. Secured via Appendix 7 Marine Pollution Contingency Plan .



ID	Parameter	Description of Mitigation Measure	Securing Mechanism
		actions and reporting requirements in the event of spills and collision incidents. The MPCP will also contain emergency plans and mitigation procedures for a range of potential marine pollution incidents.	
M-8	Cable Plan	Development of, and adherence to, a Cable Plan (incorporating a Cable Burial Risk Assessment). The Cable Plan will confirm planned cable routing, burial, and any additional external cable protection, and will set out methods for post-installation cable monitoring. Furthermore, this plan will detail environmental sensitivities and design considerations to mitigate, as far as practicable, the effects of offshore cable laying and associated protection during installation and operation of the Windfarm Development Area (WDA) infrastructure. The amount of cable protection utilised will be minimised where practicable; protection will be used only where design burial depths are not reasonably practicable or where crossings require it.	Section 36 and marine licence consent conditions. Secured via the requirement for a Cable Plan, to be developed and submitted to the Scottish Ministers for approval before commencement of construction.
M-18	Navigational Safety Plan	Development of, and adherence to, a Navigational Safety Plan (NSP). This plan will describe measures put in place related to navigational safety, including information on safety zones, charting, construction buoyage, temporary lighting and marking, and means of notification of activities associated with the WDA to other sea users.	Section 36 and marine licence consent conditions. Secured via Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan.
M-19	Notice to Mariners	Advanced warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher webpage. All notices will be uploaded to the Project website (www.machairwind.com).	Included within NSP content which is a standard Section 36 and marine licence consent condition. An outline NSP has been provided in Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan.
M-20	Lighting and Marking Plan	Development of, and adherence to, a Lighting and Marking Plan (LMP). This plan will set out the marine and aviation navigational lighting and marking measures to be applied during the construction and operation of the WDA. This will be in accordance with Appendix 12 Outline Lighting and Marking Plan which will incorporate the requirements of the Air Navigation Order 2016, of the	Section 36 and marine licence consent conditions. An outline LMP has been provided in Appendix 12 Outline Lighting and Marking Plan.



ID	Parameter	Description of Mitigation Measure	Securing Mechanism
		MOD and other relevant legislation and guidance. Infrared lights will be installed on the WTGs to ensure full compliance.	
M-23	Safety Zones	Application for and use of Safety Zones of up to 500 m during construction, major repairs and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, O&M and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards. During the O&M phase, there would be 500 m safety zones around any structure where major maintenance is ongoing.	Application submitted under Section 95 and Schedule 16 of the Energy Act 2004. Will also be referenced within the Navigational Safety Plan, secured under standard Section 36 and Marine Licence condition.
M-25	Marking	All WDA infrastructure will be appropriately marked on the United Kingdom Hydrographic Office Admiralty Charts.	Provision of relevant information to UKHO required under standard marine licence conditions.
M-26	Search and Rescue	Development of a Search and Rescue (SAR) checklist in consultation with the Maritime and Coastguard Agency (MCA) to ensure compliance with Marine Guidance Note (MGN) 654 and its annexes. This will be completed post consent.	Section 36 and marine licence consent conditions. Secured via Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan.
M-27	Emergency Response Cooperation Plan	Development of, and adherence to, an Emergency Response Cooperation Plan (ERCoP). This plan ensures co-operation with the MCA by detailing the design parameters of the WDA, emergency contact details, and processes to be followed.	Section 36 and marine licence consent conditions. Secured via an Emergency Response and Cooperation Plan which will be developed and submitted prior to construction.
M-28	Guard Vessels	Where appropriate, guard vessels will be used to ensure adherence with Safety Zones (M-23) or advisory passing distances.	Section 36 and marine licence consent conditions. Secured via Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan.
M-29	Marine Coordination Centre	A marine coordination centre will be implemented to manage Project vessels throughout construction, operation and maintenance and decommissioning.	Section 36 and marine licence consent conditions. Secured via Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan.
M-30	Blade Tip Clearance / Air Gap	Blade tip clearance height / Air Gap of at least 28.4 m above Highest Astronomical	Compliance with MGN 654 is a standard Section 36 and marine licence consent condition (typically captured under NSP



ID	Parameter	Description of Mitigation Measure	Securing Mechanism
		Tide (HAT), noting this exceeds MGN 654 requirements.	condition) and secured under project design.
M-31	Vessel Marine Regulations	Compliance of all Project vessels with international Marine Regulations as adopted by the Flag State, notably Convention on International Regulations for Preventing Collisions at Sea (COLREGs) IMO, 1972/77) and International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974).	Section 36 and marine licence consent conditions. Secured via Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan . The Project will employ a dedicated competent resource to verify compliance with international Marine Regulations, including a Marine Operations Management Manual and a suite of Project documentation specific to Marine Operations.
M-32	Vessel Management Plan	Development of, and adherence to, a Vessel Management Plan. This plan will provide the procedures for management and coordination of vessels to mitigate the impact of Project vessels.	Section 36 and marine licence consent conditions. Secured via Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan .
M-34	Development Specification and Layout Plan	Development of, and adherence to, a Development Specification and Layout Plan. The layout of the WTGs will be finalised post consent. Consultation with the MCA and Northern Lighthouse Board (NLB) will be undertaken to ensure that the specific WTG layout is compatible with potential SAR activity (M-26).	Section 36 and marine licence consent conditions. Secured via the requirement for a Design Specification and Layout Plan, which will be submitted to Scottish Ministers for approval prior to the commencement of construction.
M-35	Failures of Lighting and Marking	Failures of the lighting and marking in the WDA will be appropriately reported and rectified as soon as practicable. Interim hazard warnings (i.e. Notice to Mariners (M-19)) or alternate temporary mitigation will be put in place as required. Associated communication procedures, including with the MCA and NLB will be included in the post-consent LMP (M-20).	Section 36 and marine licence consent conditions. Secured via Appendix 12 Outline Lighting and Marking Plan .
M-36	Site Navigation Marking	Marking and lighting of the site following consultation with NLB and in line with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Guidance G1162 (IALA, 2021) including a buoyed construction area.	Section 36 and marine licence consent conditions. Secured via Appendix 12 Outline Lighting and Marking Plan .
M-46	Decommissioning Programme	Development and adherence to a Decommissioning Programme. This programme will identify all the items of equipment, infrastructure and materials that have been installed or drilled and describes the decommissioning solution for each, whilst considering the potential environmental effects of each method	Section 36 and marine licence consent conditions. Secured via a Decommissioning Programme, which will be developed and submitted to Scottish Ministers for approval before commencement of construction.



ID	Parameter	Description of Mitigation Measure	Securing Mechanism
		alongside appropriate mitigation techniques that can be implemented.	

13.10 APPROACH TO ASSESSMENT

54. As noted in **Section 13.1**, this topic chapter considers the WDA Study Area and existing environment only. A combined assessment of the construction, O&M and decommissioning of the WDA activities, Offshore ECC and OnTDA activities (commensurate with the level of detail that is available at the time of carrying out that appraisal) is also provided and the methodology for this is described in **Section 13.10.2**. This approach will ensure a holistic view is undertaken of the entire Project.

13.10.1 Windfarm Development Area-Alone

13.10.1.1 Methodology

55. **Chapter 5 EIA Methodology** provides a summary of the general impact assessment methodology applied in this WDA EIAR. The assessment uses the conceptual ‘source-pathway-receptor’ model. The model identifies potential impacts resulting from the proposed activities on the environment and sensitive receptors within it.

56. The following sections provide an overview of the assessment methodology to assess the potential impacts on shipping and navigation only. As a requirement of MGN 654, the assessment methodology for shipping and navigation within this chapter is consistent with that provided in the MachairWind Scoping Report (MachairWind, 2024) and was agreed with stakeholders during the Hazard Workshop (see **Section 13.3**). The full methodology for assessing impacts on shipping and navigation receptors is set out within **Appendix 13.1 Navigational Risk Assessment**.

13.10.1.2 Significance of Effect

57. As required under the MCA Methodology (Annex 1 to MGN 654) (MCA, 2021), and in line with international marine risk assessment standards, the IMO Formal Safety Assessment (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 predicted frequency of occurrence and severity of consequence in order that its significance can be determined as ‘broadly acceptable’, ‘tolerable with mitigation’, or ‘unacceptable’ via a risk matrix as shown in **Table 13.11**.

58. The criteria for defining frequency of occurrence in this chapter are outlined in **Table 13.9** below.

Table 13.9 Frequency of occurrence ranking definitions

Rank	Description	Definition
1	Negligible	Less than 1 occurrence per 10,000 years
2	Extremely unlikely	1 per 100 to 10,000 years
3	Remote	1 per 10 to 100 years
4	Reasonably probable	1 per 1 to 10 years
5	Frequent	Yearly



59. The criteria for defining severity of consequence in this chapter are outlined in **Table 13.10** below.

Table 13.10 Definition of terms relating to the severity of consequence

Rank	Description	Definition			
		People	Property	Environment	Business
1	Negligible	No perceptible risk	No perceptible risk	No perceptible risk	No perceptible risk
2	Minor	Slight injury(ies)	Minor damage to property, (i.e. superficial damage)	Tier 1 local assistance required	Minor reputational risks – limited to users
3	Moderate	Multiple minor or single serious injury	Damage not critical to operations	Tier 2 limited external assistance required	Local reputational risks
4	Serious	Multiple serious injuries or single fatality	Damage resulting in critical risk to operations	Tier 2 regional assistance required	National reputational risks
5	Major	More than one fatality	Total loss of property	Tier 3 national assistance required	International reputational risks

Table 13.11 IMO FSA risk matrix for shipping and navigation

Consequences	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				

60. For the purposes of the shipping and navigation impact assessment a level of effect determined as being of unacceptable significance is considered a ‘significant’ effect in EIA terms and not As Low As Reasonably Practicable (ALARP), requiring additional mitigation measures (secondary mitigation) implemented beyond those considered embedded to reduce the residual effect to within tolerable with mitigation or broadly acceptable parameters. Effects determined to be tolerable with mitigation or broadly acceptable are not significant in EIA terms and are ALARP. In the case of tolerable with mitigation, this acknowledges that the embedded mitigation (and secondary mitigation if identified) is sufficient to achieve ALARP status.



61. It is noted that the assessment in **Appendix 13.1 Navigational Risk Assessment**, uses FSA terminology as required under MGN 654 (MCA, 2021). Differences in terminology are detailed in **Table 13.12**. This chapter uses the EIA terminology.

Table 13.12 Summary of terminology differences 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	Recipient of the effect.

13.10.2 Combined Assessment: Windfarm Development Area, Offshore Export Cable Corridor and Onshore Development Transmission Development Area Methodology

62. This section presents how the Applicant will assess interactions between the WDA, Offshore ECC and OnTDA (i.e. considering impact interactions and additive effects to determine if any effects would be materially elevated from those assessed for the WDA-alone assessment). The approach enables potential interactions between each Development Area to be identified and assessed, ensuring a whole Project assessment is undertaken in a manner that is meaningful and proportionate. This is referred to as the combined assessment.

63. In this context, interactions are considered where there may be spatial overlap of effects and additive effects are considered where there may be incremental effects on the same receptor, including increased temporal effects.

64. Worst-case scenarios for all WDA infrastructure (which includes up to 144 WTGs, up to two OSPs, up to 147 nm (272 km) of OSP link cables and up to 108 nm (200 km) of the offshore export cable(s) which could be located within the WDA red line boundary) has been incorporated into the worst-case scenario for the WDA-alone assessment (**Table 13.6** and **Section 13.11.1**).

65. To inform the combined assessment, a set of assumptions were developed which includes a preliminary boundary for the Offshore ECC and OnTDA (connect point new Girvan, South Ayrshire), anticipated project components and associated construction methods and timelines. These are set out in **Chapter 3 Project Description**, Sections 3.7 and 3.8. Offshore and onshore engineering and environmental surveys enabling Offshore ECC and OnTDA corridor refinement are anticipated to take place after the WDA EIAR has been submitted to the consenting authorities.

66. Within the upcoming Offshore ECC and OnTDA consenting applications, their respective scoping and EIARs will take account of all likely effects predicted within the WDA EIA and present updated combined assessments using the latest available information covering all aspects of the Project.

67. **Section 13.11.2** includes a qualitative discussion where potential interactions and additive effects between the WDA and the Offshore ECC and OnTDA have been identified, with the aim of determining whether effects could result in those of greater significance than assessed for the WDA-alone assessment. To accompany the description, a combined assessment summary table is



provided. Only residual effects from the WDA-alone assessment are taken forward for consideration in the combined assessment.

13.10.3 Cumulative Effects Assessment Methodology

68. The CEA considers the impacts arising from the activities and infrastructure associated with the whole-Project (i.e. the WDA, Offshore ECC and OnTDA) as well as cumulatively with other relevant plans, projects and activities. The general approach to the CEA for shipping and navigation includes identifying potential cumulative effects, identifying a short list of plans and projects for consideration and evaluating the significance of cumulative effects. **Chapter 5 EIA Methodology** provides further details on the general approach to the CEA.

69. In line with the methodology set out in **Chapter 5 EIA Methodology**, the CEA is considered in two main stages with stage 1 split into two steps:

- **Stage 1a:** Screening of Potential Cumulative Impacts;
- **Stage 1b:** Screening of other plans, projects and activities; and
- **Stage 2:** CEA.

70. Stage 1a involves the screening / identification of which whole-Project impacts could have a cumulative effect with other plans, projects and activities (described as ‘impact screening’).

71. Stage 1b is the screening of other plans, projects and activities. This has been undertaken in accordance with the methodology described in **Appendix 13.1 Navigational Risk Assessment**, noting that this differs from the standard EIA approach. The maximum distance within which developments are considered for the CEA is 50 nm from the WDA on the basis that there is not considered to be a direct pathway between the Project and any development beyond 50 nm from the WDA. This distance is standard within shipping and navigation CEAs and provides a good overview of cumulative traffic patterns.

72. Stage 2 is the assessment of cumulative effects. For the assessment stage, information has been gathered based on the CEA Long-List of plans or projects taken forward from the screening stage. A tiered approach is used to provide a framework for placing relative weight on the potential for each plan or project to be included in the CEA, based on the plan’s or project’s current stage of maturity, certainty in the design or effects and overall availability of detail on which to carry out an assessment. Projects or plans that will be assessed in Stage 1b will use the following tiers:

- Tier 1 assessment: projects which are operational (but not part of the baseline), under construction, those with consent and those projects where an application has been submitted but not yet determined;
- Tier 2 assessment: all plans/projects assessed under Tier 1, plus those projects with a Scoping Report and/or Scoping Opinion; and
- Tier 3 assessment: all plans/projects assessed under Tier 1 and Tier 2, plus those projects likely to come forward where a Crown Estate Scotland (CES) Option to Lease Agreement or equivalent has been granted (i.e., ScotWind and Innovation and Targeted Oil & Gas (INTOG) projects).

13.10.4 Transboundary Effects Assessment Methodology

73. The transboundary effect assessment considers the potential for effects to occur as a result of the WDA on shipping and navigation receptors within the Exclusive Economic Zone of other European Economic Area (EEA) member states or other interests of EEA member states. **Chapter 5 EIA Methodology** provides further details on the approach to the transboundary effect assessment.



74. As the baseline for vessel traffic movements has principally been established using AIS whose carriage requirements are set by the IMO and apply across all EEAs, transboundary effects are considered as part of the assessment of significance in **Section 13.11**.

13.11 ASSESSMENT OF SIGNIFICANCE

13.11.1 Windfarm Development Area-Alone Assessment of Significance

75. The potential effects on shipping and navigation receptors that may occur during construction, operation and maintenance and decommissioning of the WDA infrastructure are assessed in the following sections. The assessment follows the methodology set out in **Section 13.10.1** and is based on the realistic worst-case scenarios defined in **Section 13.7**, with consideration of embedded mitigation measures identified in **Section 13.9**.

76. This assessment has been undertaken on the basis of all embedded mitigation measures outlined in **Table 13.8**. The embedded mitigation measures relevant for each impact are listed in the summary **Table 13.27**.

13.11.1.1 *Impact 1: Vessel Displacement and Increased Third-party Vessel to Vessel Collision Risk*

13.11.1.1.1 Construction

77. Construction activities associated with the Project may displace existing vessel routes or activity in normal or adverse conditions, which may increase the risk of a collision between third-party vessels.
78. These related elements are each considered in the subsequent assessment in terms of frequency of occurrence and severity of consequence.

13.11.1.1.1.1 *Vessel Displacement in Normal Conditions*

13.11.1.1.1.1.1 Vessel Displacement

79. Vessel traffic data collected during the winter 2023 and summer 2024 surveys has been used to establish the vessel traffic baseline, alongside 12 months of AIS collected via terrestrial receivers between March 2024 and February 2025 (alongside a supplementary seasonal vessel traffic survey). These vessel traffic datasets have been validated by Anatec's ShipRoutes database and analysed to identify the volume of traffic passing within or in proximity to WDA. Additionally, main routes were recognised from these datasets using the principles set out in MGN 654 (MCA, 2021) (see **Section 13.8.1.3**).
80. 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 offshore windfarms and consultation it is anticipated that the significant majority of commercial vessels will choose not to navigate within the buoyed construction area; therefore, some main route deviations are likely to be required. This aligns with outputs of the consultation process (see **Section 13.3**), with general consensus being that most commercial vessels would choose to pass either inshore or offshore of the WDA.
81. The full methodology for classifying main route deviations is provided in **Appendix 13.1 Navigational Risk Assessment**, noting it is in line with MGN 654 (MCA, 2021). A deviation will be required for three of the 12 main routes identified within the shipping and navigation Study Area, with details provided in **Table 13.7**. Combined, a total of six vessels per week are estimated to require route deviations due to the WDA, summarised as follows:

- Route 4: four vessels per week, anticipated to deviate inshore of the WDA;



- Route 10: one vessel per week, anticipated to deviate inshore of the WDA; and
 - Route 12: one vessel per week, anticipated to deviate offshore of the WDA.
82. The deviations are in general relatively low magnitude, with all three increasing the total route length by less than 0.4%. Route 4 is anticipated to increase distance by the largest, both in absolute and relative terms, with a 2.0 nm increase (equating to a 0.34% increase in total route length).
83. For vessels choosing to pass inshore, reductions on the eastern boundary of the WDA have increased the available searoom for potential users between the WDA and the nearby islands of Colonsay and Islay. Key stakeholders including the MCA, NLB, CoS, DFDS and the Port of Glensanda have confirmed they are content with the reductions made and subsequent searoom when the expected number of vessels and their relative sizes are accounted for i.e., that vessels displaced inshore of the WDA will have sufficient searoom. Further details are provided in **Appendix 13.1 Navigational Risk Assessment**. The locations of construction buoys near the inshore area will be agreed with NLB as part of the LMP process to ensure that the available searoom remains suitable during the construction phase.
84. For the limited number of displaced vessels choosing to pass offshore, there is searoom to the west to accommodate such deviations, noting that other than the two buoys located approximately 5 nm from the WDA (see **Section 13.8.1.1**), as well as a small section at depth 17.5 m below CD approximately 8 nm to the west, there are no other navigational restrictions in the vicinity. No concerns with the available searoom to the west were raised during consultation, including during the Hazard Workshops.
85. It is noted that no lifeline ferry routes will be impacted by the buoyed construction area. The closest such routeing involves ferry routeing to/from Scalascaig on the eastern coast of Colonsay, approximately 9.8 nm to the east. Based on consultation outputs (see **Section 13.3**), only one to two Calmac Ferries per year transit through the shipping and navigation Study Area in proximity to the WDA (with the vessel traffic surveys indicating that the majority of those recorded head to/from the east of Colonsay and are as such unlikely to be impacted by the Project); however these vessels would route inshore of the buoyed construction area.
86. Based on experience at previously-constructed offshore windfarms, it is anticipated that fishing vessels and recreational vessels may also 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 (and that, as per consultation from SWFPA in **Section 13.3**, this depends both on the WTG characteristics and vessel Master discretion). Safety zones will be applied for and are proposed to entail an area of up to 500 m around structures during construction where activity is ongoing, and up to 50 m around installed structures pre-commissioning. However, fishing vessels and recreational vessels may be more likely to transit through the WDA than commercial vessels, in particular in any areas of the WDA where active construction is not ongoing, or structures are not yet present.
87. For any smaller vessels that do choose to deviate, there is considered to be sufficient searoom outside of the WDA for transits from such vessels to be accommodated, for similar reasoning to that outlined for commercial vessels above.
88. The main consequences of vessel displacement will be increased journey times and distances for affected third-party vessels, under the assumption that the buoyed construction area will be deployed around the maximum extent of the WDA. Any notable safety impacts are considered unlikely given the available searoom. Vessels are expected to comply with international and flag state regulations (including COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974)) and will be able to passage plan in advance given the promulgation of information relating to the WDA and relevant nautical charts.



89. Relevant embedded mitigation measures include charting of infrastructure, compliance with MGN 654, promulgation of information, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), and guard vessels. These will ensure an increased awareness from third-party vessels and will also assist in passage planning to limit the extent of deviations.

13.11.1.1.1.1.2 Collision Risk

90. From historical incident data, no collision incidents between third-party vessels have occurred directly as a result of a UK offshore windfarm.
91. In poor visibility, third-party vessels may experience limitations regarding visual identification of other third-party vessels, when passing on the periphery of, or inside of, the buoyed construction area if any structures have been installed, with the impact increasing as more structures are installed. This limitation may increase the potential for an encounter. However, this would be mitigated by the application of the COLREGs (including reduced speeds) in adverse weather conditions. Moreover, the minimum spacing between structures (944 m) will be sufficient to ensure any visual hindrance is very short-term in nature.
92. Based on the pre-windfarm modelling, the baseline collision risk levels within the shipping and navigation Study Area are low, with an estimated vessel to vessel collision risk of one every 2,240 years. This rises to an estimate of a return period of one every 1,568 years for a future case growth of 20% in vessel traffic, due to the volume of traffic in the area relative to available sea space.
93. Post-windfarm, the collision frequency was estimated at one in 1,748 years, representing an additional collision incident every 7,969 years. This rises to an estimated return period of one every 1,223 years for a future case growth of 20% in vessel traffic. This remains a low level of collision risk, which is also reflected when considering future case traffic levels. Reductions made to the WDA throughout the EIA process have facilitated a lower collision risk relative to the boundary at Scoping, with key stakeholders content with navigational safety in the inshore area (see **Section 13.3**).
94. Due to the likelihood for deviation of routes east of the buoyed construction area (dependent on weather conditions), it is possible that commercial vessels will be displaced closer to inshore areas in which fishing vessels are noted to be actively fishing (see **Section 13.3** and **Section 13.8.1.3**). This may then lead to an increase in encounters between commercial vessels and fishing vessels. However, there will be a low number of commercial vessels expected to be inshore (see **Section 13.8.1.3**) and with the application of the COLREGs in relation to the exhibiting of appropriate lights and shapes for fishing vessels engaged in fishing, the risk is considered manageable. This aligns with local fisher feedback from the local Hazard Workshop (see **Section 13.3**), there were no concerns expressed regarding collision risk in the sea area between the WDA and Colonsay.
95. Historical collision incident data studied (see **Section 13.8.1.2**) noted a total of one collision within the shipping and navigation Study Area between 2015 and 2024 in the RNLI dataset (a fishing vessel outside the WDA); and one collision between 2005 and 2024 in the MAIB dataset (a recreational vessel inside the WDA). No further details on these collisions are available, including the second vessel involved for each case.
96. The most likely consequences in the event of an encounter between two or more third-party vessels is the implementation of avoidance action in line with the COLREGs, with the vessels involved able to resume their respective passages with no long-term consequences.
97. Based on historic incident data, should an encounter develop into a collision incident, it is most likely to involve minor contact resulting in minor damage to the vessels with no harm to people and no substantial reputational risks. As a worst-case with very low frequency of occurrence one of the vessels could receive substantial damage or founder with Potential Loss of Life (PLL) and pollution.



Foundering may be more likely where one of the vessels is a small craft (e.g. fishing vessel or recreational vessel) due to the size and stability of the vessel.

98. Relevant embedded mitigation measures include charting of infrastructure, compliance with MGN 654, promulgation of information, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), guard vessels, and vessel marine regulations (i.e., the presence of Project vessels which may be able to assist in the event of an incident). These will ensure an increased awareness from third-party vessels and will also assist in passage planning to limit the extent of deviations.

13.11.1.1.1.1.3 Frequency of Occurrence

99. The frequency of occurrence in relation to displacement of vessel traffic resulting in increased third-party collision risk during the construction phase is considered Extremely Unlikely.

13.11.1.1.1.1.4 Severity of Consequence

100. The severity of consequence in relation to displacement of vessel traffic resulting in increased third-party collision risk during the construction phase is considered Moderate.

13.11.1.1.1.1.5 Significance of Effect

101. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of vessel displacement and increased third-party vessel to vessel collision risk during construction of the Project is considered to be broadly acceptable.

102. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.1.1.2 Vessel Displacement in Adverse Weather

13.11.1.1.1.2.1 Qualification of Risk

103. Adverse weather includes wind, wave, and tidal conditions as well as reduced visibility due to fog. Adverse weather can hinder a vessel's standard route, its speed of navigation and/or its ability to enter the destination port. Adverse weather routes are assessed to be significant course adjustments to mitigate vessel motion in adverse weather conditions. When transiting in adverse weather conditions, a vessel is likely to encounter various types of weather and tidal phenomena, which may lead to severe roll motions, potentially causing damage to cargo, equipment and/or discomfort and danger to persons on board. The sensitivity of a vessel to these phenomena will depend on the actual stability parameters, hull geometry, vessel type, vessel size and speed. Various stakeholders have noted that the local area to the WDA is known for unfavourable transit conditions.

104. Based on review of the input received, it is unlikely that commercial vessels would choose to make transit through the buoyed construction area during adverse weather conditions. Larger deviations may be required than during more favourable conditions (e.g., vessels may choose to increase passing distance from the buoyed construction area, or vessels that would typically choose to pass inshore may choose to pass offshore). However, with consultation feedback from the MCA noting that the inshore area is of suitable width to allow for safe navigation (see **Section 13.3**), and due to the distance of the WDA from navigational features to the west (see **Section 13.8.1.1**), there is considered to be sufficient searoom to safely accommodate either transit option.

105. The Applicant engaged with DFDS and the Port of Glensanda throughout the NRA process, with feedback for a site reduction in the eastern portion of the WDA requested by DFDS to provide additional room for vessels transiting inshore in adverse weather. As noted in **Appendix 13.1**



Navigational Risk Assessment, this was actioned, and as per **Section 13.3**, DFDS and the Port of Glensanda were content with the site updates made.

106. As noted during consultation (see **Section 13.3**), the majority of CalMac ferries operate to the east of Colonsay, with these vessels heading to/from destinations further to the east. Due to the location of the WDA west of Colonsay, the Project will not impact upon routeing of these vessels. It was also noted that, if Project vessels chose to shelter east of Colonsay, this may impact CalMac routeing. An outline VMP and NSP are provided in **Appendix 13 Vessel Management Plan and Navigational Safety Plan**, noting that the final version of this document will address anchoring locations. Various factors will go into the decision of anchoring locations if shelter is sought, including baseline routeing in the area including that of CalMac.
107. From a navigational safety perspective, the likely consequences are an increase in delays, deviations or as an unlikely worst-case a cancellation of sailing. However, due to the distance between the WDA and ports in the vicinity, there will likely be sufficient time to plan passage accordingly to allow for minimisation of required deviations. Key stakeholders including DFDS have confirmed they are content with the WDA.
108. Full details of the assessment and consultation undertaken in relation to adverse weather are provided in **Appendix 13.1 Navigational Risk Assessment** and **Section 13.3**, respectively.
109. Relevant embedded mitigation measures include charting of infrastructure, compliance with MGN 654, promulgation of information, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), and guard vessels. These will ensure an increased awareness from third-party vessels and will also assist in passage planning to limit the extent of deviations.
110. It was raised during consultation that consideration would need to be given to the often-challenging conditions in the area regarding loss of buoys and general navigation (see **Section 13.3**). The LMP will include specific management procedures pertinent to each aid to navigation, to ensure that risks to mariners from the loss of an aid to navigation (either due to confusion on position or an aid to navigation becoming an allision hazard) are minimised. Indicative procedures have been provided in **Appendix 12 Outline Lighting and Marking Plan**, noting that details of this will be agreed in the final LMP once layout positions have been defined. For this hazard, this would pertain to loss of station of a cardinal mark or special mark, loss of key navigational light on a structure which is marked with temporary lighting during construction, and any aid to navigation failing to meet IALA standards.

13.11.1.1.1.2.2 Frequency of Occurrence

111. The frequency of occurrence in relation to displacement of vessel traffic in adverse weather during the construction phase is considered Extremely Unlikely.

13.11.1.1.1.2.3 Severity of Consequence

112. The severity of consequence in relation to displacement of vessel traffic in adverse weather during the construction phase is considered Serious.

13.11.1.1.1.2.4 Significance of Effect

113. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as serious, the overall effect of vessel displacement in adverse weather during construction of the Project is considered to be tolerable.
114. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.



13.11.1.1.2 Operation and Maintenance

- 115. The presence of surface-piercing WDA infrastructure, as well as maintenance activities associated with the Project, may displace existing vessel routes or activity which may increase the risk of a collision between third-party vessels.
- 116. These two related elements are each considered in the subsequent assessment in terms of frequency of occurrence and severity of consequence.

13.11.1.1.2.1 *Vessel Displacement in Normal Conditions*

13.11.1.1.2.1.1 **Vessel Displacement**

- 117. Based on experience at existing operational offshore windfarms and input during consultation, it is anticipated that the significant majority of commercial vessels will choose not to navigate within the WDA and therefore some main route deviations are likely to be required as per the respective construction phase hazard.
- 118. The nature of the deviations is expected to be similar to that discussed for the equivalent construction phase hazard, with the deviations in general relatively low magnitude and effective passage planning likely reducing the extent. Further, it is likely that deviations will be well established by the time that construction has been completed and O&M has commenced, with vessels becoming familiar with the Project.
- 119. The minimum spacing of 944 m between windfarm structures is considered sufficient to accommodate transits of smaller vessels, noting there will be no restrictions on entry into the WDA with the exception of any active 500 m major maintenance safety zones. Based on experience at existing operational offshore windfarms, fishing vessels and recreational vessels may be more likely to navigate through the WDA than commercial vessels (noting that as per consultation from SWFPA in **Section 13.3**, this depends on the WTG characteristics and vessel Master discretion). It was noted during the local Hazard Workshop that the structure separation distance would likely allow for transit and active fishing operations again at individual Master discretion (see **Section 13.3**). Given the completion of construction activities and lower frequency of any major maintenance, the level of displacement for these vessels is likely to be reduced during the O&M phase compared to construction.
- 120. It is noted that displacement of active commercial fishing is assessed separately in **Chapter 12 Commercial Fisheries**.
- 121. RYA Scotland noted that the WDA is on the direct route from Ireland to the west of Mull, through the Passage of Tiree to the north or to the Western Isles, and that a large deviation would be required to avoid the WDA. These vessels would be free to utilise the WDA for transit should they choose to, noting that the layout will be approved by the Scottish Ministers following consultation with the MCA and NLB to ensure safe surface navigation for vessels choosing to navigate internally.
- 122. Regarding displacement as a result of project vessel activity in the vicinity, given that any maintenance activities associated with the Project will be less frequent than during the construction phase and localised, the likelihood of vessel displacement due to these activities is considered to be low. Additionally, such activities will likely be limited to within the WDA and therefore not impact upon commercial vessel routing.
- 123. The main consequences of vessel displacement will be increased journey times and distances for affected third-party vessels, under the assumption that the WTGs will be built to the full extent of the WDA. Any notable safety impacts are considered unlikely given the available searoom. Vessels are expected to comply with international and flag state regulations (including COLREGs (IMO, 1972/77)



and SOLAS (IMO, 1974)) and will be able to passage plan in advance given the promulgation of information relating to the Project and relevant nautical charts.

124. Relevant embedded mitigation measures include charting of infrastructure, compliance with MGN 654, promulgation of information, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), guard vessels, and vessel marine regulations.

13.11.1.1.2.1.2 Collision Risk

125. As noted for the equivalent construction phase hazard, three of the 12 main routes will likely deviate as a result of the presence of the Project. Post windfarm collision frequency was estimated at one every 1,748 years.
126. Any displacement of commercial vessels due to maintenance activities is not anticipated to affect available searoom to such an extent that the risk of a collision between third-party vessels is materially increased. This is due to the lesser frequency of maintenance activities compared to during construction, spatially limited extent of the maintenance operation at any given time and the likelihood that maintenance activities are located internally with the WDA.
127. An additional factor is the potential for structures to obscure vessels from one another, thus hindering ability to comply with COLREGs (IMO, 1972/77), noting that during O&M all structures will be present. The minimum spacing of 944 m between windfarm structures will likely provide sufficient searoom for visual observations, with full obstruction likely only to occur when vessels are at opposite ends of a row. Collision risk is likely to be low in such cases due to the distance between vessels.
128. In the event of an encounter between third-party vessels arising from displacement during O&M, it is likely to be localised and short in duration, with collision avoidance action implemented by the vessels involved, as per compliance with COLREGs (IMO, 1972/77), to ensure that a collision incident does not develop.
129. As per the respective construction phase hazard, historical collision incident data 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 the vessels involved able to resume their respective passages and undertake a full inspection at the next port.
130. As with the equivalent construction phase hazard, the displacement of commercial vessels inshore of the WDA may result in closer proximity to fishing vessels actively fishing. This may then lead to an increase in encounters between commercial vessels and fishing vessels but there is sufficient searoom to allow both activities to safely occur with application of the COLREGs.
131. As an unlikely worst-case scenario, a high impact collision event could occur. This may result in vessel foundering and subsequent PLL, as well as pollution. Foundering may be more likely where one of the vessels is a small craft (e.g. fishing vessel or recreational vessel) due to the size and stability of the vessel. In such a circumstance, vessels associated with the Project may attend the incident under SOLAS obligations and in liaison with the MCA and the procedures within the ERCoP and MPCP would be implemented.
132. Relevant embedded mitigation measures include charting of infrastructure, compliance with MGN 654, promulgation of information, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), guard vessels, and vessel marine regulations (i.e., the presence of Project vessels which may be able to assist in the event of an incident).

13.11.1.1.2.1.3 Frequency of Occurrence

133. The frequency of occurrence in relation to displacement of vessel traffic resulting in increased third-party collision risk during the O&M phase is considered Extremely Unlikely.



13.11.1.1.2.1.4 Severity of Consequence

134. The severity of consequence in relation to displacement of vessel traffic resulting in increased third-party collision risk during the O&M phase is considered Moderate.

13.11.1.1.2.1.5 Significance of Effect

135. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of vessel displacement and increased third-party vessel to vessel collision risk during O&M of the Project is considered to be broadly acceptable.

136. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.1.2.2 Vessel Displacement in Adverse Weather

13.11.1.1.2.2.1 Qualification of Risk

137. Based on review of the input received, it is likely that no commercial vessels would choose to make transit through the WDA during adverse weather conditions. Larger deviations may be required than during more favourable conditions (e.g., vessels may choose to increase passing distance from the WDA or transit inshore); however, there is considered to be sufficient searoom to safely accommodate the chosen transits.

138. The Applicant engaged with DFDS and the Port of Glensanda throughout the NRA process, with feedback requesting a site reduction in the eastern portion of the WDA to provide additional room for vessels transiting inshore including in adverse weather. As noted in **Appendix 13.1 Navigational Risk Assessment**, this was actioned. Stakeholders have since confirmed they are content with the WDA.

139. As noted during consultation (see **Section 13.3**), the majority of CalMac ferries operate to the east of Colonsay, with these vessels heading to/from destinations further to the east. Due to the location of the WDA west of Colonsay, the Project will therefore not impact upon routeing of these vessels. It was also noted that, if Project vessels chose to shelter east of Colonsay, this may impact CalMac routeing. An outline VMP and NSP are provided in **Appendix 13 Vessel Management Plan and Navigational Safety Plan**, noting that the final version of this document will address anchoring locations. Various factors will go into the decision of anchoring locations if shelter is sought, including baseline routeing in the area including that of CalMac. Such activity is less likely in O&M when compared to construction.

140. From a navigational safety perspective, worst-case consequences are an increase in delays, deviations or cancellation. However, due to the distance between the WDA and ports in the vicinity, there will likely be sufficient time to plan passage accordingly to allow for minimisation of required deviations. Key stakeholders including DFDS have confirmed they are content with the WDA.

141. Full details of the assessment and consultation undertaken in relation to adverse weather are provided in **Appendix 13.1 Navigational Risk Assessment** and **Section 13.3**, respectively.

142. Relevant embedded mitigation measures include charting of infrastructure, compliance with MGN 654, promulgation of information, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), and guard vessels.

143. It was raised during consultation that consideration would need to be given to the often-challenging conditions in the area regarding loss of buoys and general navigation (see **Section 13.3**). The LMP will include specific management procedures pertinent to each aid to navigation, to ensure that risks to mariners from the loss of an aid to navigation (either due to a structure being obscured or confusion



on position) are minimised. Indicative procedures have been provided in **Appendix 12 Outline Lighting and Marking Plan**, noting that details of this will be agreed in the final LMP once layout positions have been defined. For this hazard, this would pertain to loss of key navigational light on a structure, failure of a sound signal for greater than 120 hours, any aid to navigation failing to meet IALA standards, and throughout significant maintenance works where an increase in navigational risk is posed (such as removal/replacement of a key aid to navigation).

13.11.1.1.2.2 Frequency of Occurrence

144. The frequency of occurrence in relation to displacement of vessel traffic in adverse weather during the O&M phase is considered Extremely Unlikely.

13.11.1.1.2.3 Severity of Consequence

145. The severity of consequence in relation to displacement of vessel traffic in adverse weather during the O&M phase is considered Serious.

13.11.1.1.2.4 Significance of Effect

146. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as serious, the overall effect of vessel displacement in adverse weather during O&M of the Project is considered to be tolerable.

147. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.

13.11.1.1.3 Decommissioning

13.11.1.1.3.1 Vessel Displacement in Normal Conditions

13.11.1.1.3.1.1 Qualification of Risk

148. Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, this hazard is expected to be similar in nature to the equivalent construction stage hazard. It is noted that in the case of subsea cables, sections may be left in situ to avoid unnecessarily disturbing the seabed, resulting in fewer areas in which project removal operations would occur, and so less disruption to third-party vessel transits. This would be confirmed through consultation and assessment to ensure the most suitable approach was taken. 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. Post-decommissioning, as there will be no requirement for Project vessels to participate in works involving the subsea cables, there will be no impact from the Project on vessel displacement and subsequent increased risk of third-party collisions.

149. The use of a buoyed decommissioning area analogous to the buoyed construction area and decommissioning safety zone analogous to its construction phase equivalent are assumed and will result in similar main route deviations to those established for the equivalent construction stage hazard. By the time of decommissioning, deviations will be well established, with vessels likely to continue on their typical routeing around the buoyed decommissioning area. Assuming removal of the surface-piercing infrastructure, there will be no further need for vessels to deviate post-decommissioning.

150. Relevant embedded mitigation measures would be as per the respective construction phase.



13.11.1.1.3.1.2 Frequency of Occurrence

151. The frequency of occurrence in relation to displacement of vessel traffic resulting in increased third-party collision risk during the decommissioning phase is considered Extremely Unlikely.

13.11.1.1.3.1.3 Severity of Consequence

152. The severity of consequence in relation to displacement of vessel traffic resulting in increased third-party collision risk during the decommissioning phase is considered Moderate.

13.11.1.1.3.1.4 Significance of Effect

153. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of vessel displacement and increased third-party vessel to vessel collision risk during decommissioning of the Project is considered to be broadly acceptable.

154. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.1.3.2 Vessel Displacement in Adverse Weather

13.11.1.1.3.2.1 Qualification of Risk

155. Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, this hazard is expected to be similar in nature to the equivalent construction stage hazard. It is noted that in the case of subsea cables, sections may be left in situ to avoid unnecessarily disturbing the seabed, resulting in fewer areas in which project removal operations would occur, and so less disruption to third-party vessel transits. This would be confirmed through consultation and assessment to ensure the most suitable approach was taken. 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. The Project will not impact upon vessel displacement in adverse weather once decommissioning has completed assuming all surface piercing infrastructure is removed.

156. Relevant embedded mitigation measures would be as per the respective construction phase.

13.11.1.1.3.2.2 Frequency of Occurrence

157. The frequency of occurrence in relation to displacement of vessel traffic in adverse weather during the decommissioning phase is considered Extremely Unlikely.

13.11.1.1.3.2.3 Severity of Consequence

158. The severity of consequence in relation to displacement of vessel traffic in adverse weather during the decommissioning phase is considered Serious.

13.11.1.1.3.2.4 Significance of Effect

159. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as serious, the overall effect of vessel displacement in adverse weather during decommissioning of the Project is considered to be tolerable.

160. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.

13.11.1.1.4 Summary

161. The significance of effect for vessel displacement and increased third-party vessel to vessel collision risk in all phases is summarised in **Table 13.13**.



Table 13.13 Significance of effect for impact 1: vessel displacement and increased third-party vessel to vessel collision risk

Phase	Receptor	Frequency of Occurrence	Severity of Consequence	Significance of Risk	Additional Mitigation	Residual Risk and EIA Significance
Construction	All users (<i>normal conditions</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant
	All users (<i>adverse weather</i>)	Extremely Unlikely	Serious	Tolerable with Mitigation		Tolerable with Mitigation and ALARP, not significant
O&M	All users (<i>normal conditions</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant
	All users (<i>adverse weather</i>)	Extremely Unlikely	Serious	Tolerable with Mitigation		Tolerable with Mitigation and ALARP, not significant
Decommissioning	All users (<i>normal conditions</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant
	All users (<i>adverse weather</i>)	Extremely Unlikely	Serious	Tolerable with Mitigation,		Tolerable with Mitigation and ALARP, not significant



13.11.1.2 Impact 2: Increased Third-party Vessel to Project Vessel Collision Risk

13.11.1.2.1 Construction

13.11.1.2.1.1 Qualification of Risk

162. The presence of vessels associated with construction activities of the Project may increase encounters and thus collision risk for vessels already operating in the area.
163. During the construction phase of the Project there may be up to 1,140 vessel movements per year made by up to 117 project vessels on-site simultaneously. This will include large vessels including those which are RAM. It is assumed that construction vessels will be on-site throughout the entire duration of the construction phase.
164. Encounters and collision risk involving project vessels will be managed through the implementation of marine coordination with full details of this to be provided in the NSP and VMP. Project vessels will also be expected to carry AIS and comply with flag state regulations including the COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974). COLREGs will remain the navigational priority for project vessels at all times.
165. Applications for safety zones of 500 m around structures with on-going construction activities will be sought during the construction phase and will protect deployed project vessels. Minimum advisory passing distances and guard vessels, as defined by risk assessment, may also be implemented where safety zones do not apply, for example around cable installation vessels. Details of safety zones, minimum safe passing distances and guard vessels will be promulgated including via Notifications to Mariners and Kingfisher Bulletins.
166. Appropriate marine lighting and marking during construction including the buoyed construction area will be set out in the LMP for approval by the Scottish Ministers following consultation with the NLB. These navigational aids will increase mariner awareness when in proximity to ongoing construction works and sensitive operations in the WDA.
167. Third-party vessels may experience decreased capability to visually identify project vessels entering and exiting the WDA during reduced visibility; however, this hazard will be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions and the mandatory carriage of AIS by project vessels regardless of size.
168. Based on historical incident data, there has been one instance of a third-party vessel colliding with a project vessel in the UK (see **Appendix 13.1 Navigational Risk Assessment** for further details). In this case, moderate vessel damage was reported with no harm to persons. It is noted that the incident occurred in 2011 and awareness of offshore wind developments and application of the measures outlined above has improved and been refined considerably in the interim, with no further collision incidents reported since.
169. If an encounter between a project vessel and third-party vessel occurs, it is likely to be localised and short in duration. Assuming the implementation of collision avoidance action as required by the COLREGs, the most likely outcome will be any vessels involved being able to resume their respective passages or activities with no long-term consequences.
170. In the event of a collision, the likely consequences will be minor contact between the vessels resulting in minor damage and no injuries to persons. As an unlikely worst-case scenario, foundering could occur resulting in PLL and pollution. Foundering may be more likely where one of the vessels is a small craft (e.g., fishing vessel, recreational vessel, or Crew Transfer Vessel (CTV)) due to the size and stability of the vessel. Other project vessels may be able to assist in the event of a collision under



SOLAS obligation and the adherence to the ERCoP, noting this would be done in liaison with the MCA. If pollution were to occur in proximity to the WDA or involving a project vessel, the MPCP will be implemented to reduce the risks.

171. As noted during consultation (see **Section 13.3**), there is the potential for a construction buoy to drift off-station. An outline LMP has been included within **Appendix 12 Outline Lighting and Marking Plan** to provide monitoring and management plans to facilitate IALA availability requirements to be met and include details of the process to be followed in the event that a buoy does lose station. Full details will be expanded in the finalised post-consent version of this document.
172. Relevant embedded mitigation measures include advisory passing distances, application for safety zones, buoyed construction / decommissioning area, charting of infrastructure, guard vessels, marine coordination for Project vessels, pollution planning, Project vessel compliance with international marine regulations (i.e., COLREGs), and promulgation of information.

13.11.1.2.1.2 *Frequency of Occurrence*

173. The frequency of occurrence in relation to encounters and collision risk between project vessels and third-party vessels during the construction phase is considered to be Extremely Unlikely.

13.11.1.2.1.3 *Severity of Consequence*

174. The severity of consequence in relation to encounters and collision risk between project vessels and third-party vessels during the construction phase is considered to be Moderate.

13.11.1.2.1.4 *Significance of Effect*

175. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of encounters and collision risk between project vessels and third-party vessels during construction of the Project is considered to be broadly acceptable.
176. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.2.2 *Operation and Maintenance*

13.11.1.2.2.1 *Qualification of Risk*

177. The presence of vessels associated with maintenance activities of the Project may increase encounters and thus collision risk for vessels already operating in the area. During the O&M phase of the Project there may be up to 423 vessel movements annually (during major maintenance; i.e. likely fewer during normal operations). This will include vessels which are RAM.
178. As for the construction phase, encounter and collision risk involving project vessels will be managed through the implementation of marine coordination as will be set out in the NSP and VMP. Project vessels will also be expected to carry AIS and comply with flag state regulations including the COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974). COLREGs will remain the navigational priority for project vessels at all times.
179. Applications for safety zones of 500 m around structures with major maintenance activities during O&M will be sought and will protect deployed project vessels. Minimum advisory passing distances and guard vessels, as defined by risk assessment, may also be implemented where safety zones do not apply. Details of safety zones, minimum safe passing distances and guard vessels will be promulgated including via Notifications to Mariners and Kingfisher Bulletins.



180. Appropriate operational marine lighting and marking will be set out in an LMP for approval by the Scottish Ministers, following consultation with the NLB. These navigational aids will increase mariner awareness when in proximity to the WDA. In the event of the loss of an aid to navigation, procedures detailed within the LMP will be followed to minimise disruption to navigation (as discussed with key stakeholders including the MCA). This LMP will be finalised post-consent.
181. Third-party vessels may experience decreased capability to visually identify project vessels during reduced visibility, especially if visual observations are obscured by WTGs. However, this hazard will be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions and the mandatory carriage of AIS by project vessels regardless of size.
182. As discussed in the equivalent construction phase hazard, there has been one instance of a third-party vessel colliding with a project vessel in the UK (moderate vessel damage reported with no harm to persons). This incident occurred in 2011, and awareness of offshore wind developments and application of the measures outlined above has improved and been refined considerably in the interim, with no further collision incidents reported since. If an encounter between a project vessel and third-party vessel occurs, it is likely to be localised and short in duration. Assuming the implementation of collision avoidance action as required by the COLREGs, the most likely outcome will be any vessels involved being able to resume their respective passages or activities with no long-term consequences.
183. In the event of a collision, the likely consequences will be minor contact between the vessels resulting in minor damage and no injuries to persons. As an unlikely worst-case scenario, foundering could occur resulting in PLL and pollution. Foundering may be more likely where one of the vessels is a small craft (e.g., fishing vessel, recreational vessel, or CTV) due to size and stability. Other project vessels may be able to assist in the event of a collision under SOLAS obligation and the adherence to the ERCoP, noting this would be done in liaison with the MCA. If pollution were to occur in proximity to the Project or involving a project vessel, the MPCP will be implemented to reduce the risks.
184. Relevant embedded mitigation measures include advisory passing distances, application for safety zones, charting of infrastructure, guard vessels, marine coordination for Project vessels, pollution planning, Project vessel compliance with international marine regulations (i.e., COLREGs), and promulgation of information.

13.11.1.2.2.2 *Frequency of Occurrence*

185. The frequency of occurrence in relation to encounters and collision risk between project vessels and third-party vessels during the O&M phase is considered to be Extremely Unlikely.

13.11.1.2.2.3 *Severity of Consequence*

186. The severity of consequence in relation to encounters and collision risk between project vessels and third-party vessels during the O&M phase is considered to be Moderate.

13.11.1.2.2.4 *Significance of Effect*

187. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of encounters and collision risk between project vessels and third-party vessels during O&M of the Project is considered to be broadly acceptable.
188. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.



13.11.1.2.3 Decommissioning

13.11.1.2.3.1 Qualification of Risk

189. The presence of vessels associated with decommissioning activities of the Project may increase encounters and thus collision risk for vessels already operating in the area.
190. Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, including the vessels involved, this hazard is expected to be similar in nature to the equivalent construction phase, including the number of vessel movements by decommissioning vessels. It is noted that in the case of subsea cables it is expected that they will be left in situ (resulting in fewer areas in which project removal operations would occur, and so less disruption to third-party vessel transits) 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 left in situ. As Project vessels will not be on-site post-decommissioning, there will be no impact upon third-party to Project vessel collision risk, assuming that all surface-piercing infrastructure is removed.
191. On this basis the same assumptions made for the equivalent construction phase hazard in terms of frequency and consequence apply.

13.11.1.2.3.2 Frequency of Occurrence

192. The frequency of occurrence in relation to encounters and collision risk between project vessels and third-party vessels during the decommissioning phase is considered to be Extremely Unlikely.

13.11.1.2.3.3 Severity of Consequence

193. The severity of consequence in relation to encounters and collision risk between project vessels and third-party vessels during the decommissioning phase is considered to be Moderate.

13.11.1.2.3.4 Significance of Effect

194. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of encounters and collision risk between project vessels and third-party vessels during decommissioning of the Project is considered to be broadly acceptable.
195. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.2.4 Summary

196. The significance of effect for increased third-party vessel to project vessel collision risk in all phases is summarised in **Table 13.14**.



Table 13.14 Significance of effect for impact 2: increased third-party vessel to project vessel collision risk

Phase	Receptor	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Additional Mitigation	Residual Effect
Construction	All users	Extremely Unlikely	Moderate	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant
O&M	All users	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant
Decommissioning	All users	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant



13.11.1.3 Impact 3: Reduced Access to Local Ports and Harbours

13.11.1.3.1 Construction

13.11.1.3.1.1 Qualification of Risk

197. Activities associated with the construction of structures and cables may displace existing routes/activity restricting access to ports/harbours.
198. Up to 1,140 vessel movements per year by construction vessels may be made throughout the construction phase and will include vessels which are RAM. The Project has concluded a preliminary study of which ports may be suitable sufficient for construction and Hunterston, Kishorn and Stornoway seem to be potentially suitable at this stage. However, the Project will decide on which ports to use post-consent. Project vessels will be managed by marine coordination, including the use of traffic management procedures such as the designation of entry and exit points to and from the buoyed construction area and indicative routes to and from construction ports. Project vessels will also carry AIS and be compliant with flag state regulations including the COLREGs (IMO 1972/77); there is therefore not anticipated to be an impact on port access from project vessels.
199. In terms of the WDA itself, the closest port or harbour is Port Ellen, located approximately 24 nm to the southeast. Given the relative distance to ports in the vicinity and the anticipated deviations for the main commercial routes, it is not anticipated that there will be any substantial effect on vessel approaches to and from these beyond the deviations already outlined for impacts on vessel displacement arising from the buoyed construction area.
200. As identified during the EIA process, regular vessel transits to/from the Port of Glensanda occurred throughout the study period, and thus future transits of a similar nature may be affected. The Port of Glensanda were therefore consulted with, as per **Section 13.3**. As noted by the Port of Glensanda, the majority of vessels transit through the Sound of Mull as opposed to the area in which the WDA lies, and as such would be unaffected by the Project. In addition, the port noted that the searoom between Colonsay and the eastern boundary of the WDA is suitable for transits should they occur.
201. Due to the distance to nearby ports and harbours in the area, as well as the acknowledgement of the Port of Glensanda that regular commercial vessels to/from Glensanda will be unaffected, the WDA infrastructure and buoyed construction area are considered not likely to result in a reduction in port access past the deviations highlighted in **Section 13.11.1.1**.
202. The most likely consequences are increased journey times and distances, as per the vessel displacement hazard. As there are no pilot boarding stations in the vicinity of the Project, no effect is anticipated on port related services such as pilotage.
203. Relevant embedded mitigation measures include compliance with MGN 654, charting of infrastructure, and promulgation of information.

13.11.1.3.1.2 Frequency of Occurrence

204. The frequency of occurrence in relation to reduced access to local ports and harbours during the construction phase is considered to be Remote.

13.11.1.3.1.3 Severity of Consequence

205. The severity of consequence in relation to reduced access to local ports and harbours during the construction phase is considered to be Minor.



13.11.1.3.1.4 *Significance of Effect*

206. Taking the frequency of occurrence as remote and the severity of consequence as minor, the overall effect of reduced access to local ports and harbours during construction of the Project is considered to be broadly acceptable.
207. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.3.2 Operation and Maintenance

13.11.1.3.2.1 *Qualification of Risk*

208. Activities associated with the maintenance of structures and cables may displace existing routes/activity restricting access to ports/harbours.
209. Up to 423 vessel movements annually by O&M vessels may be made throughout the O&M phase, which will include vessels which are RAM. The Project has concluded a preliminary study of which ports may be suitable sufficient for O&M and Campbeltown, Hunterston, or the King George V dock of Glasgow are potentially suitable. This will be decided post-consent, however. Project vessels will be managed by marine coordination, including the use of traffic management procedures such as the designation of entry and exit points to and from the WDA and indicative routes to and from the base port. Project vessels will also carry AIS and be compliant with flag state regulations including the COLREGs (IMO 1972/77); there is therefore not anticipated to be an impact on ports access from project vessels.
210. As discussed in the baseline description and equivalent construction phase hazard, the closest port or harbour is Port Ellen, located approximately 24 nm to the southeast. In addition to the distances to nearby ports and subsequent limited impacts that will likely occur on these ports, it is expected that vessel patterns in the area will be well established by the O&M phase (including transits to Glensanda). It is therefore not anticipated that there will be any substantial effect on vessel approaches to and from here beyond the deviations already outlined for impacts on vessel displacement.
211. The most likely consequences are increased journey times and distances, as per the vessel displacement hazard. As there are no pilot boarding stations in the vicinity of the Project, no effect is anticipated on port-related services such as pilotage.
212. Relevant embedded mitigation measures include advisory passing distances, compliance with MGN 654, charting of infrastructure, and promulgation of information.

13.11.1.3.2.2 *Frequency of Occurrence*

213. The frequency of occurrence in relation to reduced access to local ports and harbours during the O&M phase is considered to be Extremely Unlikely.

13.11.1.3.2.3 *Severity of Consequence*

214. The severity of consequence in relation to reduced access to local ports and harbours during the O&M phase is considered to be Minor.

13.11.1.3.2.4 *Significance of Effect*

215. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as minor, the overall effect of reduced access to local ports and harbours during O&M of the Project is considered to be broadly acceptable.



216. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.3.3 Decommissioning

13.11.1.3.3.1 Qualification of Risk

217. Decommissioning activities associated with the removal of structures and cables may displace existing routes/activity restricting access to ports/harbours.
218. Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them (and as, although it is expected that subsea cables will be left in situ, for the purposes of this assessment it has been assumed that all cables will be removed during decommissioning as worst-case with only cable protection left in situ), this hazard is expected to be similar in nature to the equivalent construction phase. This includes the number of vessel movements by decommissioning vessels. Once decommissioning vessels have ceased operations, there is not expected to be an impact upon access to local ports and harbours due to the Project.
219. As with the construction stage, it is not yet known from which port(s) decommissioning activity will be based for the Project; at an indicative level however, these will likely be located at either Hunterston, Kishorn, or Stornoway.
220. On this basis the same assumptions made for the equivalent construction phase hazard in terms of frequency and consequence apply.

13.11.1.3.3.2 Frequency of Occurrence

221. The frequency of the risk of reduced access to local ports and harbours during the decommissioning phase is considered to be Remote.

13.11.1.3.3.3 Severity of Consequence

222. The severity of consequence of the risk of reduced access to local ports and harbours during the decommissioning phase is considered to be Minor.

13.11.1.3.3.4 Significance of Effect

223. Taking the frequency of occurrence as remote and the severity of consequence as minor, the overall effect of reduced port access during decommissioning of the Project is considered to be broadly acceptable.
224. Hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.3.4 Summary

225. The significance of effect for reduced access to local ports and harbours in all phases is summarised in **Table 13.15**.



Table 13.15 Significance of effect for impact 3: reduced access to local ports and harbours

Phase	Receptor	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Additional Mitigation	Residual Effect
Construction	All users	Remote	Minor	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant
O&M	All users	Extremely Unlikely	Minor	Broadly Acceptable, not significant		Broadly Acceptable, not significant
Decommissioning	All users	Remote	Minor	Broadly Acceptable, not significant		Broadly Acceptable, not significant



13.11.1.4 Impact 4: Reduction of Emergency Response Capability

13.11.1.4.1 Construction

13.11.1.4.1.1 Qualification of Risk

226. The presence of structures (including partially completed structures) as well as increased vessel activity and personnel numbers may reduce emergency response capabilities during the construction phase of the Project by increasing the number of incidents, increasing consequences, or reducing access for the responders.
227. The spatial extent of this hazard is large given the area covered by the WDA (131 nautical miles squared (nm²)) within the buoyed construction area, as well as the distance covered by air-based SAR support (the nearest SAR helicopter base is located at Prestwick, 71 nm southeast of the WDA). However, it is unlikely that a SAR operation will require the entirety of the buoyed construction area to be searched, and it is probable that a search will be restricted to a smaller area in which a casualty is known to be located (accounting for assumptions on any potential drift of the casualty).
228. During the construction phase of the Project there may be up to 1,140 vessel movements per year made by up to 117 project vessels on-site simultaneously. The presence of these vessels increases the likelihood of an incident and subsequently increases the likelihood of multiple incidents occurring simultaneously, diminishing emergency response capability. However, in the event of an incident involving a project vessel occurring in proximity to the WDA, it may be possible for Project personnel to coordinate a response independently, in liaison with the MCA.
229. Similarly, project vessels may also be able to provide additional response resource in the event of an incident involving third-party vessels, dependent on the Project vessels available, the casualty vessel(s), and the nature of the incident. Again, this would be undertaken in liaison with the MCA.
230. Of the potential impacts on reduction of emergency response capability, the most likely would be a delay to any emergency response request. As an unlikely worst-case, this could lead to a failure of emergency response to an incident resulting in PLL and pollution. However, project vessels will be managed via marine coordination, and the presence of project vessels themselves may mitigate this risk as they may assist at incidents involving other project vessels under the obligation of SOLAS (IMO, 1974) and adherence to an ERCoP, noting this would be undertaken with liaison with the MCA. The MPCP will also be implemented should pollution occur.
231. From recent SAR data, there was an average of two to three SAR taskings per year recorded throughout the ten-year period within the shipping and navigation Study Area, although none were recorded within the WDA itself. The frequency of incidents in proximity to the WDA is not anticipated to increase significantly from the current level given the measures noted above which will be in place.
232. The layout will be approved by the Scottish Ministers following consultation with the MCA and in line with MGN 654 requirements to ensure any SAR operations that do occur within the WDA are facilitated. This will ensure both the final layout and any interim scenarios during construction facilitate SAR access. A SAR checklist will also be completed and agreed with the MCA as required under MGN 654.
233. Relevant embedded mitigation measures include compliance with MGN 654, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), marine coordination for Project vessels, pollution planning, and Project vessel compliance with international marine regulations (i.e., SOLAS).



13.11.1.4.1.2 *Frequency of Occurrence*

234. The frequency of occurrence relating to the risk of reduced emergency response capabilities during the construction phase is considered to be Extremely Unlikely.

13.11.1.4.1.3 *Severity of Consequence*

235. The severity of consequence relating to the risk of reduced emergency response capabilities during the construction phase is considered to be Serious.

13.11.1.4.1.4 *Significance of Effect*

236. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as serious, the overall effect of reduced emergency response capability during construction of the Project is considered to be tolerable.

237. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.

13.11.1.4.2 *Operation and Maintenance*

13.11.1.4.2.1 *Qualification of Risk*

238. The presence of structures as well as increased vessel activity and personnel numbers may reduce emergency response capabilities during the O&M phase of the Project by increasing the number of incidents, increasing consequences or reducing access for the responders.

239. Up to 423 vessel movements may be made annually by project vessels during the O&M phase of the Project. It is assumed that maintenance vessels will be on-site throughout the majority of the O&M phase, although severe weather may lead to vessels being withdrawn. The presence of these vessels will increase the likelihood of an incident occurring, diminishing emergency response capability. As noted in the equivalent construction impact, it may be possible both for the Project to respond appropriately to a project vessel incident occurring in proximity to the WDA, reducing potential impacts on SAR resources; as well as to assist with SAR operations for third-party incidents. In addition, it is unlikely that a SAR operation will require the entirety of the WDA to be searched, with any necessary searches restricted to a smaller area in which a casualty is known to be located (accounting for assumptions on any potential drift of the casualty).

240. Of the potential impacts on reduction of emergency response capability, the most likely would be a delay to any emergency response request. As an unlikely worst-case, this could lead to a failure of emergency response to an incident resulting in PLL and pollution. However, project vessels will be managed via marine coordination, and the presence of project vessels themselves may mitigate this risk as they may assist at incidents involving other project vessels under the obligation of SOLAS (IMO, 1974) and adherence to an ERCoP, noting this would be undertaken with liaison with the MCA and updated for O&M prior to completion of construction. The MPCP will also be implemented should pollution occur.

241. From recent SAR data, there was an average of two to three SAR taskings per year recorded throughout the ten-year period within the shipping and navigation Study Area, although none were recorded within the WDA itself. The frequency of incidents in proximity to the WDA is not anticipated to increase significantly from the current level given the measures noted above which will be in place.

242. The layout will be approved by the Scottish Ministers following consultation with the MCA and in line with MGN 654 requirements to ensure any SAR operations that do occur within the WDA are



facilitated. A SAR checklist will also be completed and agreed with the MCA as required under MGN 654.

243. Relevant embedded mitigation measures include compliance with MGN 654, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), marine coordination for Project vessels, pollution planning, and Project vessel compliance with international marine regulations (i.e., SOLAS). In addition, the ERCoP will be updated from its construction version to account for the O&M phase.

13.11.1.4.2.2 Frequency of Occurrence

244. The frequency of occurrence relating to the risk of reduced emergency response capabilities during the O&M phase is considered to be Extremely Unlikely.

13.11.1.4.2.3 Severity of Consequence

245. The severity of consequence relating to the risk of reduced emergency response capabilities during the O&M phase is considered to be Serious.

13.11.1.4.2.4 Significance of Effect

246. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as serious, the overall effect of reduced emergency response capability during O&M of the Project is considered to be tolerable with mitigation.

247. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.

13.11.1.4.3 Decommissioning

13.11.1.4.3.1 Qualification of Risk

248. The presence of structures as well as increased vessel activity and personnel numbers may reduce emergency response capabilities during the decommissioning phase of the Project by increasing the number of incidents, increasing consequences, or reducing access for the responders.

249. Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them (and as, although it is expected that subsea cables will be left in situ, for the purposes of this assessment it has been assumed that all cables will be removed during decommissioning as worst-case with only cable protection left in situ), this hazard is expected to be similar in nature to the equivalent construction phase. This includes the number of vessel movements by decommissioning vessels.

250. On this basis the same assumptions made for the equivalent construction phase hazard in terms of frequency and consequence apply.

13.11.1.4.3.2 Frequency of Occurrence

251. The frequency of occurrence relating to the risk of reduced emergency response capabilities during the decommissioning phase is considered to be Extremely Unlikely.

13.11.1.4.3.3 Severity of Consequence

252. The severity of consequence relating to the risk of reduced emergency response capabilities during the decommissioning phase is considered to be Serious.



13.11.1.4.3.4 Significance of Effect

253. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as serious, the overall effect of reduced emergency response capability during decommissioning of the Project is considered to be tolerable with mitigation.
254. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.

13.11.1.4.4 Summary

255. The significance of effect for reduction of emergency response capabilities in all phases is summarised in **Table 13.16**.



Table 13.16 Significance of effect for impact 4: reduction of emergency response capabilities

Phase	Receptor	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Additional Mitigation	Residual Effect
Construction	All users	Extremely Unlikely	Serious	Tolerable with Mitigation	N/A	Tolerable with Mitigation and ALARP, not significant
O&M	All users	Extremely Unlikely	Serious	Tolerable with Mitigation		Tolerable with Mitigation and ALARP, not significant
Decommissioning	All users	Extremely Unlikely	Serious	Tolerable with Mitigation		Tolerable with Mitigation and ALARP, not significant



13.11.1.5 Impact 5: Vessel-to-structure Allision Risk

256. Presence of surface-piercing structures will lead to creation of allision risk for vessels. The spatial extent of the hazard is small given that a vessel must be in close proximity to a structure for an allision incident to occur. Each allision element is considered in turn in terms of frequency of occurrence and severity of consequence, with the resulting significance of the residual risk across the various elements summarised at the end of the assessment. The forms of allision considered include:

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

13.11.1.5.1 Construction

13.11.1.5.1.1 Powered Allision Risk

13.11.1.5.1.1.1 Qualification of Risk

257. Presence of surface-piercing structures, including those that are partially constructed, within the buoyed construction area of the WDA will lead to the creation of allision risk for vessels during the construction phase.

258. Marine lighting and marking for the construction phase will be implemented as defined within the LMP approved by the Scottish Ministers following consultation with the NLB. This will include use of a buoyed construction area to alert mariners to the ongoing works and potential for partially completed structures. Individual structures will also be marked with temporary lighting throughout the construction phase. In the event of the loss of an aid to navigation, procedures detailed within the LMP will be followed to minimise disruption to navigation (as discussed with key stakeholders including the MCA). This LMP will be finalised post-consent.

259. Promulgation of information and marking on charts of the buoyed construction area will ensure vessels can passage plan in advance to minimise risk.

260. Should an allision occur, the consequences will depend on multiple factors. Fishing vessels and recreational vessels are considered most vulnerable to the hazard and 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 founder resulting in PLL and pollution. Project vessels may assist in the event of an allision under SOLAS obligations and the adherence to the ERCoP, in liaison with the MCA. If pollution were to occur, then the MPCP will be implemented to reduce the environmental risk.

261. Relevant embedded mitigation measures include safety zones, advisory passing distances, charting of infrastructure, compliance with MGN 654, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), marine coordination for Project vessels, pollution planning, Project vessel compliance with international marine regulations (i.e., SOLAS), and promulgation of information.

13.11.1.5.1.1.2 Frequency of Occurrence

262. The frequency of occurrence in relation to powered vessel to structure allision risk during the construction phase is considered to be Extremely Unlikely.

13.11.1.5.1.1.3 Severity of Consequence

263. The severity of consequence in relation to powered vessel to structure allision risk during the construction phase is considered to be Moderate.



13.11.1.5.1.1.4 Significance of Effect

264. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of powered vessel to structure allision risk during construction of the Project is considered to be broadly acceptable.
265. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.5.1.2 Drifting Allision Risk

13.11.1.5.1.2.1 Qualification of Risk

266. Based on historical incident data, there have been no instances of a third-party vessel alliding with an offshore windfarm structure whilst not under command. However, there is considered to be potential for a vessel to be adrift; this is reflected in the RNLI incident data reviewed in proximity to the WDA which indicates that machinery failure is the most common incident type. During construction, third-party vessels may choose to avoid the WDA. However, it should also be considered that vessels may be less familiar with the Project than they will be by the O&M phase.
267. In circumstances where a vessel drifts towards a structure during the construction phase, powered vessels may be able to regain power prior to reaching the WDA (by rectifying any fault). Failing this, the vessel's emergency response procedures would be implemented which may include an emergency anchoring event or the use of thrusters (depending on availability and power supply).
268. Where the deployment of the anchor is not possible (e.g. for small craft), any project vessels on-site associated with construction may be able to render assistance in liaison with the MCA and in line with SOLAS obligations (IMO, 1974). This response will be managed via His Majesty's Coastguard (HMCG) and marine coordination and depends on the type and capability of vessels on-site, as well as the size of the casualty vessel in question. 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.
269. Should an allision occur, the consequences will include the unlikely worst-case of foundering, PLL and pollution. In the highly unlikely scenario of a drifting allision incident resulting in pollution, the implementation of the MPCP will reduce the environmental risk. Project vessels may assist in the event of an allision under SOLAS (IMO, 19742) obligation and the adherence to the ERCoP, in line with the MCA. 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.
270. Relevant embedded mitigation measures include pollution planning, implementation of an ERCoP, and Project vessel compliance with international marine regulations (i.e., SOLAS).

13.11.1.5.1.2.2 Frequency of Occurrence

271. The frequency of occurrence in relation to drifting vessel to structure allision risk during the construction phase is considered to be Extremely Unlikely.

13.11.1.5.1.2.3 Severity of Consequence

272. The severity of consequence in relation to drifting vessel to structure allision risk during the construction phase is considered to be Moderate.



13.11.1.5.1.2.4 Significance of Effect

273. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of drifting vessel to structure allision risk during construction of the Project is considered to be broadly acceptable.
274. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.5.1.3 Internal Allision Risk

13.11.1.5.1.3.1 Qualification of Risk

275. Based on experience at offshore windfarms under construction, it is anticipated that commercial vessels will be unlikely to choose to navigate internally within the WDA, and will begin to avoid the area following deployment of the buoyed construction area. However, fishing and recreational vessels may be more likely to transit through. As noted during the local Hazard Workshop (see **Section 13.3**), fishers commented that the minimum spacing of 944 m would be sufficient both for transit and active fishing to occur, and as such they may also choose to utilise the WDA when partially completed structures are present.
276. The worst-case consequences reported for vessels involved in an allision incident involving a UK offshore windfarm has been flooding, with no life-threatening injuries to persons reported. If an allision incident were to occur, project vessels may assist under obligation of SOLAS (IMO, 1974) and adherence to the ERCoP in liaison with the MCA. Additionally, if pollution occurs as a result of an allision incident, the MPCP would be implemented where appropriate.
277. If a vessel chooses to transit within the WDA, the minimum spacing of 944 m between structures including partially completed structures is considered sufficient for safe internal navigation, with fishers noting during the Hazard Workshop the space would be suitable both for transiting and active fishing (dependent on conditions). In addition, as noted by RYA Scotland during consultation, those operating recreational craft in the area will likely be experienced sailors (see **Section 13.3**). Furthermore, the temporary lighting and marking and display on nautical charts will provide mitigation against internal allision risk. Failure of aids to navigation were raised as a concern by RYA Scotland during the mainland Hazard Workshop (see **Section 13.3**) - in the case of loss of an aid to navigation through any means, the LMP will outline specific management procedures to alleviate any navigational safety concerns. Any vessel planning to transit through the WDA is expected to passage plan in advance in accordance with SOLAS Chapter V (IMO, 1974) and promulgation of information will ensure that vessels have good awareness of the Project.
278. Relevant embedded mitigation measures include the buoyed construction area, advisory passing distances, charting of infrastructure, compliance with MGN 654, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), marine coordination for Project vessels, pollution planning, Project vessel compliance with international marine regulations (i.e., SOLAS), promulgation of information, and minimum blade tip clearance of 28.4 m above HAT.
279. It was raised during consultation that consideration would need to be given to the often-challenging conditions in the area regarding loss of buoys and general navigation (see **Section 13.3**). The LMP will include specific management procedures pertinent to each aid to navigation, to ensure that risks to mariners from the loss of an aid to navigation (either due to a structure being obscured or confusion on position) are minimised. For this hazard, this would pertain to loss of key navigational light on a structure, failure of a sound signal for greater than 120 hours, any aid to navigation failing to meet IALA standards, and throughout significant maintenance works where an increase in navigational risk is posed (such as removal/replacement of a key aid to navigation).



13.11.1.5.1.3.2 Frequency of Occurrence

280. The frequency of occurrence of internal vessel to structure allision risk during the construction phase is considered to be Remote.

13.11.1.5.1.3.3 Severity of Consequence

281. The severity of consequence of internal vessel to structure allision risk during the construction phase is considered to be Moderate.

13.11.1.5.1.3.4 Significance of Effect

282. Taking the frequency of occurrence as remote and the severity of consequence as moderate, the overall effect of internal vessel to structure allision risk during construction of the Project is considered to be tolerable.

283. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.

13.11.1.5.2 Operation and Maintenance

13.11.1.5.2.1 *Powered Allision Risk*

13.11.1.5.2.1.1 Qualification of Risk

284. The base case annual powered vessel to structure allision frequency was estimated to be 2.36×10^{-4} , corresponding to a return period of one every 4,231 years. This rises to an estimate of 2.82×10^{-4} for a future case growth of 20% in vessel traffic, corresponding to a return period of one every 3,550 years. This relatively low allision risk is reflective of the volume of traffic passing at the minimum mean distance of 1 nm from the WDA.

285. Based on historical incident data, there have been four reported instances of a third-party vessel alliding with an operational offshore windfarm structure in the UK (in the Irish Sea and Southern North Sea). All four of these incidents involved a fishing vessel. These allisions resulted in minor to moderate damage to the vessels with minor injury to crew members.

286. Marine lighting and marking will be implemented in agreement with the NLB and defined within the LMP. Promulgation of information and marking on charts will ensure vessels can passage plan in advance to minimise risk. In the event of the loss of an aid to navigation, procedures detailed within the LMP will be followed to minimise disruption to navigation (as agreed upon with key stakeholders including the MCA). This LMP will be finalised post-consent.

287. Should an allision occur, the consequences will depend on multiple factors. Fishing vessels and recreational vessels are considered most vulnerable to the hazard and 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 founder resulting in PLL and pollution. Project vessels may assist in the event of an allision under SOLAS obligations and the adherence to the ERCoP, in liaison with the MCA. If pollution were to occur, then the MPCP will be implemented to reduce the environmental risk.

288. Relevant embedded mitigation measures include advisory passing distances, charting of infrastructure, compliance with MGN 654, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), marine coordination for Project vessels, pollution planning, Project vessel compliance with international marine regulations (i.e., SOLAS), and promulgation of information.



13.11.1.5.2.1.2 Frequency of Occurrence

289. The frequency of occurrence in relation to powered vessel to structure allision risk during the O&M phase is considered to be Extremely Unlikely.

13.11.1.5.2.1.3 Severity of Consequence

290. The severity of consequence in relation to powered vessel to structure allision risk during the O&M phase is considered to be Moderate.

13.11.1.5.2.1.4 Significance of Effect

291. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of powered vessel to structure allision risk during O&M of the Project is considered to be broadly acceptable.

292. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.5.2.2 Drifting Allision Risk

13.11.1.5.2.2.1 Qualification of Risk

293. The base case annual drifting vessel to structure allision frequency was estimated to be 6.38×10^{-5} , corresponding to a return period of one every 15,680 years. This rises to an estimate of 7.55×10^{-5} for a future case growth of 20% in vessel traffic, corresponding to a return period of one every 13,236 years. This relatively low allision risk is reflective of the volume of traffic passing at the minimum mean distance of 1 nm from the WDA and the need for a vessel to become adrift prior to a drifting allision event occurring.

294. Based on historical incident data, there have been no instances of a third-party vessel alliding with an operational offshore windfarm structure whilst not under command. However, there is considered to be potential for a vessel to be adrift; this is reflected in the RNLI incident data reviewed in proximity to the WDA which indicates that machinery failure is the most common incident type.

295. In circumstances where a vessel drifts towards a structure, powered vessels may be able to regain power prior to reaching the WDA (by rectifying any fault). Failing this, the vessel's emergency response procedures would be implemented which may include an emergency anchoring event or the use of thrusters (depending on availability and power supply).

296. Where the deployment of the anchor is not possible (e.g. for small craft), any project vessels on-site may be able to render assistance in liaison with the MCA and in line with SOLAS obligations (IMO, 1974). This response will be managed via HMCG and marine coordination and depends on the type and capability of vessels on-site, as well as the size of the casualty vessel in question. 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.

297. Should an allision occur, the consequences will include the unlikely worst-case of foundering, PLL and pollution. In the highly unlikely scenario of a drifting allision incident resulting in pollution, the implementation of the MPCP will reduce the environmental risk. Project vessels may assist in the event of an allision under SOLAS (IMO, 1974) obligation and the adherence to the ERCoP, in line with the MCA. 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.

298. Relevant embedded mitigation measures include pollution planning, implementation of an ERCoP, and Project vessel compliance with international marine regulations (i.e., SOLAS).



13.11.1.5.2.2.2 Frequency of Occurrence

299. The frequency of occurrence in relation to drifting vessel to structure allision risk during the O&M phase is considered to be Extremely Unlikely.

13.11.1.5.2.2.3 Severity of Consequence

300. The severity of consequence in relation to drifting vessel to structure allision risk during the O&M phase is considered to be Moderate.

13.11.1.5.2.2.4 Significance of Effect

301. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of drifting vessel to structure allision risk during O&M of the Project is considered to be broadly acceptable.

302. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.5.2.3 Internal Allision Risk

13.11.1.5.2.3.1 Qualification of Risk

303. Based on experience at existing operational offshore windfarms, it is anticipated that commercial vessels will be unlikely to choose to navigate internally within the WDA. However, fishing and recreational vessels may be more likely to transit through noting they may choose not to depending on various conditions. As noted during the local Hazard Workshop (see **Section 13.3**), fishers commented that the minimum spacing of 944 m would be sufficient both for transit and active fishing to occur.

304. The base case fishing vessel to structure allision frequency is estimated to be 7.5×10^{-2} , corresponding to a return period of approximately one in 13 years. This rises to an estimate of 9.0×10^{-2} for a future case growth of 20% in vessel traffic, corresponding to a return period of one every 11 years. This return period is reflective of the volume of fishing vessel traffic in the shipping and navigation Study Area, both in transit and engaged in active fishing. Conservative modelling has been undertaken with the assumption that fishing levels in proximity to the WTGs will not change. In reality, fishing vessels will account for the presence of the WTGs and may choose to transit or fish elsewhere.

305. The worst-case consequences reported for vessels involved in an allision incident involving a UK offshore windfarm has been flooding, with no life-threatening injuries to persons reported. If an allision incident were to occur, project vessels may assist under obligation of SOLAS (IMO, 1974) and adherence to the ERCoP in liaison with the MCA. Additionally, if pollution occurs as a result of an allision incident, the MPCP would be implemented where appropriate.

306. If a vessel chooses to transit within the WDA, the minimum spacing of 944 m between structures is considered sufficient for safe internal navigation, with fishers noting during the Hazard Workshop the space would be suitable both for transiting and active fishing (dependent on conditions). In addition, as noted by RYA Scotland during consultation, those operating recreational craft in the area will likely be experienced sailors (see **Section 13.3**). Furthermore, operational lighting and marking and marking on nautical charts will provide mitigation against internal allision risk. Failure of aids to navigation were raised as a concern by RYA Scotland during the mainland Hazard Workshop (see **Section 13.3**) - in the case of loss of an aid to navigation through any means, the LMP will outline specific management procedures to alleviate any navigational safety concerns. Any vessel planning to transit through the WDA is expected to passage plan in advance in accordance with SOLAS



Chapter V (IMO, 1974) and promulgation of information will ensure that vessels have good awareness of the Project.

307. As raised by SWFPA during the mainland Hazard Workshop (see **Section 13.3**), should a recreational vessel under sail enter the proximity of a WTG, there are also potential for effects such as wind shear, masking and turbulence to occur. From previous studies of offshore wind developments, it has been concluded that WTGs do reduce wind velocity downwind of a WTG (MCA, 2022) 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 or the coastline. In addition, no practical issues have been raised by recreational users to date when operating in proximity to existing offshore wind developments.
308. Relevant embedded mitigation measures include advisory passing distances, charting of infrastructure, compliance with MGN 654, lighting and marking in agreement with NLB (in line with IALA Recommendation G1162), marine coordination for Project vessels, pollution planning, Project vessel compliance with international marine regulations (i.e., SOLAS), promulgation of information, and minimum blade tip clearance of 28.4 m above HAT.
309. It was raised during consultation that consideration would need to be given to the often-challenging conditions in the area regarding loss of buoys and general navigation (see **Section 13.3**). The LMP will include specific management procedures pertinent to each aid to navigation, to ensure that risks to mariners from the loss of an aid to navigation (either due to a structure being obscured or confusion on position) are minimised. For this hazard, this would pertain to loss of key navigational light on a structure, failure of a sound signal for greater than 120 hours, any aid to navigation failing to meet IALA standards, and throughout significant maintenance works where an increase in navigational risk is posed (such as removal/replacement of a key aid to navigation).

13.11.1.5.2.3.2 Frequency of Occurrence

310. The frequency of occurrence of internal vessel to structure allision risk during the O&M phase is considered to be Remote.

13.11.1.5.2.3.3 Severity of Consequence

311. The severity of consequence of internal vessel to structure allision risk during the O&M phase is considered to be Moderate.

13.11.1.5.2.3.4 Significance of Effect

312. Taking the frequency of occurrence as remote and the severity of consequence as moderate, the overall effect of internal vessel to structure allision risk during O&M of the Project is considered to be tolerable.
313. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.

13.11.1.5.3 Decommissioning

13.11.1.5.3.1 Qualification of Risk

314. It is likely that allision risk during decommissioning will be similar to that observed for the construction phase, noting similar scenarios on-site, including partially removed structures within a buoyed decommissioning area. On this basis the same assumptions made for the equivalent construction phase hazard in terms of frequency and consequence apply.



315. There will be no allision risk post decommissioning if all surface piercing structures are removed.

13.11.1.5.3.2 *Frequency of Risk*

316. The frequency of occurrence of vessel to structure allision risk during the decommissioning phase is considered to be Extremely Unlikely for powered and drifting allision risk, and Remote for internal allision risk.

13.11.1.5.3.3 *Severity of Consequence*

317. The severity of consequence of vessel to structure allision risk during the decommissioning phase is considered to be Moderate for all three types.

13.11.1.5.3.4 *Significance of Effect*

318. Taking the frequency of occurrence as remote and the severity of consequence as moderate, the overall effect of vessel to structure powered and drifting allision risk during decommissioning of the Project is considered to be broadly acceptable.

319. For powered and drifting allision risk, the hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms for powered and drifting allision risk.

320. Taking the frequency of occurrence as remote and the severity of consequence as moderate, the overall effect of vessel to structure internal allision risk during decommissioning of the Project is considered to be tolerable.

321. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **tolerable with mitigation** and **not significant** in EIA terms.

13.11.1.5.4 *Summary*

322. The significance of effect for vessel to structure allision risk in all phases is summarised in **Table 13.17**.



Table 13.17 Significance of effect for impact 5: vessel to structure allision risk

Phase	Receptor	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Additional Mitigation	Residual Effect
Construction	All users (<i>powered allision</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant
	All users (<i>drifting allision</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant
	All users (<i>internal allision</i>)	Remote	Moderate	Tolerable with Mitigation		Tolerable with Mitigation and ALARP, not significant
O&M	All users (<i>powered allision</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant
	All users (<i>drifting allision</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant
	All users (<i>internal allision</i>)	Remote	Moderate	Tolerable with Mitigation		Tolerable with Mitigation and ALARP, not significant
Decommissioning	All users (<i>powered allision</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant
	All users (<i>drifting allision</i>)	Extremely Unlikely	Moderate	Broadly Acceptable, not significant		Broadly Acceptable, not significant
	All users (<i>internal allision</i>)	Remote	Moderate	Tolerable with Mitigation		Tolerable with Mitigation and ALARP, not significant



13.11.1.6 *Impact 6: Reduction of Under Keel Clearance*

13.11.1.6.1 Operation and Maintenance

13.11.1.6.1.1 *Qualification of Risk*

323. The presence of subsea cables and associated protection may reduce under keel clearance during the O&M phase of the Project.
324. The minimum target burial depth for the cables is 0.3 m in the case of the IACs, and 1m for the OSP link cables and export cable(s). Final required burial depths will be determined via the CBRA process which will be undertaken post consent.
325. Where burial is not reasonably practicable, cable protection may be used instead, which again will be determined by the CBRA. In line with MGN 654, any reduction in water depth which exceeds 5% will be discussed with the MCA to determine if additional mitigation is necessary. 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).
326. As depths within the WDA range between 24 m to 79 m below LAT and maximum cable protection height may be up to 3.0m, there may be reductions in water depth of more than the 5% threshold allowable under MGN 654 (MCA, 2021). Although maximum draught recorded within the vessel traffic surveys was 18.1 m (see **Section 13.8.1.3**), it is not anticipated that the larger commercial vessels with greater draughts will transit through the WDA; only small craft are expected to navigate internally. Therefore, even if the 5% threshold is triggered, it is considered unlikely that an incident would occur. In addition, no specific concerns from stakeholders were raised during consultation. Regardless, in the event that water depths are proposed to be reduced by more than 5%, consultation with the MCA and NLB would be undertaken as required under MGN 654 (noting it is also typical to include a marine licence condition requiring approval through MD-LOT where depths are proposed to be decreased by more than 5%).
327. Concerns were raised during consultation that the Project could have an impact on the Dubh Artach lighthouse as an aid to navigation, noting that part of its purpose is to mitigate grounding risk (i.e., under keel). The NLB confirmed that they were content that any impacts on the ability of the lighthouse to be used as an aid to navigation can be mitigated through the post-consent LMP process (see **Section 13.3**).
328. In the event of an underwater allision the most likely consequence is minor damage. The unlikely worst-case consequence may be vessel foundering resulting in PLL and pollution, although this is considered highly improbable.
329. Relevant embedded mitigation measures include charting of infrastructure, promulgation of information, implementation of a Cable Plan, pollution planning, and compliance with MGN 654 and its annexes.

13.11.1.6.1.2 *Frequency of Occurrence*

330. The frequency of occurrence of the risk of reduced under keel clearance due to the presence of subsea cables during O&M is considered Extremely Unlikely.



13.11.1.6.1.3 Severity of Consequence

331. The severity of consequence of the risk of reduced under keel clearance due to the presence of subsea cables during O&M is considered to be Minor.

13.11.1.6.1.4 Significance of Effect

332. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as minor, the overall effect of reduced under keel clearance due to subsea cables during O&M of the Project is considered to be broadly acceptable.

333. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.6.2 Summary

334. The significance of effect for reduction of under keel clearance is summarised in **Table 13.18**.



Table 13.18 Significance of effect for impact 6: reduction of under keel clearance

Phase	Receptor	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Additional Mitigation	Residual Effect
O&M	All users	Extremely Unlikely	Minor	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant



13.11.1.7 Impact 7: Anchor Interaction with Subsea Cables

13.11.1.7.1 Operation and Maintenance

13.11.1.7.1.1 Qualification of Risk

335. The presence of subsea cables within the WDA may increase the risk of anchor interaction.
336. The spatial extent of the hazard is small given that a vessel must be in close proximity to an IAC for an interaction to occur.
337. There are three anchoring scenarios which are considered for this hazard:
- planned anchoring – most likely as a vessel awaits a berth to enter port but may also result from adverse weather conditions, machinery failure or subsea operations;
 - unplanned anchoring – generally resulting from an emergency situation where the vessel has experienced steering failure; and
 - anchor dragging – caused by anchor failure.
338. Although the second of these scenarios may involve limited decision-making time if drifting towards a hazard (as discussed by the SWFPA in **Section 13.3**), in all three 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).
339. Only one vessel was observed to likely be at anchor within the shipping and navigation Study Area during the survey periods, with this being to the east of Colonsay. Although one anchoring vessel every one to two days was recorded within the shipping and navigation Study Area during the long-term dataset, all instances other than four were to the east of Colonsay (with three in Kilaran Bay in the northwest of Colonsay, and the other east of Nave Island). Risk of interaction with an inter-array, offshore export, or OSP link cable on a planned anchoring or dragged anchoring basis is therefore anticipated to be extremely low. In terms of emergency anchoring, any areas of high traffic volume are likely to represent the areas of highest risk, particularly where there are hazards nearby (for example, structures, rocks, shallows).
340. The likelihood of anchor interaction with a subsea cable is further reduced by the burial of the cables and use of external cable protection where required, which will be informed by the CBRA process, noting this will account for traffic volumes and vessel sizes. Moreover, with all subsea cables located within the WDA, there is a limited pathway through which commercial vessels may be subject to this hazard.
341. Should an anchor interaction occur, the most likely consequence is no damage to the cable or anchor, based on previous anchor interaction incidents. As an unlikely worst-case consequence, a snagging incident could occur and the vessel's anchor as well as the cable could be damaged, resulting in a loss of stability noting this would only occur for a smaller vessel which would be less likely to penetrate deeper into the seabed than a larger vessel.
342. Relevant embedded mitigation measures include charting of infrastructure, compliance with MGN 654, implementation and monitoring of cable protection, implementation of a Cable Plan and promulgation of information.

13.11.1.7.1.2 Frequency of Occurrence

343. The frequency of occurrence relating to the risk of anchor interaction with subsea cables during the O&M phase is considered to be Extremely Unlikely.



13.11.1.7.1.3 Severity of Consequence

344. The severity of consequence relating to the risk of anchor interaction with subsea cables during the O&M phase is considered to be Moderate.

13.11.1.7.1.4 Significance of Effect

345. Taking the frequency of occurrence as extremely unlikely and the severity of consequence as moderate, the overall effect of anchor interaction with subsea cables during O&M of the Project is considered to be broadly acceptable.

346. The hazard is considered ALARP with embedded mitigation in place and therefore no additional mitigation is required. The hazard is therefore **broadly acceptable** and **not significant** in EIA terms.

13.11.1.7.2 Summary

347. The significance of effect for anchor interaction with subsea cables is summarised in **Table 13.19**.



Table 13.19 Significance of effect for impact 7: anchor interaction with subsea cables

Phase	Receptor	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Additional Mitigation	Residual Effect
O&M	All users	Extremely Unlikely	Moderate	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant



13.11.2 Combined Assessment: Windfarm Development Area, Offshore Export Cable Corridor and Onshore Development Transmission Development Area

348. This section discusses a combined assessment considering interactions between the WDA, Offshore ECC, and OnTDA. As the OnTDA will not interact with shipping and navigation receptors, it has been screened out of the combined assessment.

13.11.2.1 Impact 1: Vessel Displacement and Increased Third-party Vessel to Vessel Collision Risk

349. Any displacement associated with the Offshore ECC will be temporary and spatially limited to the area around the installation operation. However, the planned Offshore ECC crosses the southeastern extent of the Traffic Separation Scheme (TSS) in the North Channel. During construction and maintenance of the Offshore ECC (and decommissioning if it is assumed that the Offshore ECC will not be left in situ), vessels transiting through the TSS may be temporarily impacted depending on the final export cable route. Any temporary impact on vessels using the TSS will not be increased by the WDA Infrastructure or associated activities.

350. There will be no displacement impact once the cables are laid, other than during any periods of maintenance, which would be anticipated to be a low frequency event. In the event of a collision occurring due to the displacement of vessels in relation to construction or maintenance of the Offshore ECC, the consequences will likely be similar to those discussed within **Section 13.11.1.1** (increased journey times and distances for affected third-party vessels, with potential for an encounter situation to develop).

351. The frequency of occurrence of vessel displacement and increased third-party vessel to vessel collision risk is considered to be Remote, with the severity of consequence considered to be Moderate. The resulting significance of effect is therefore considered as **tolerable with mitigation** and **not significant** in EIA terms, and so ALARP.

13.11.2.2 Impact 2: Increased Third-party Vessel to Project Vessel Collision Risk

352. Similarly to Impact 1, any project vessel presence related to the Offshore ECC will be present only during cable installation and maintenance works. Frequency during all phases will likely also be low. In the event of a collision occurring due to the presence of project vessels during construction or maintenance of the Offshore ECC, the consequences will likely be similar to those discussed within **Section 13.11.1.2** (minor contact between vessels resulting in minor damage and no injuries to persons).

353. As noted in **Section 13.11.2.1**, the planned Offshore ECC crosses the southeastern extent of the TSS in the North Channel. During construction and maintenance of the Offshore ECC (and decommissioning if it is assumed that the Offshore ECC will not be left in situ), there may be some impact on vessels transiting through the TSS, from the potential creation of encounter scenarios between project vessels and vessels transiting through the TSS during the time period in which construction/decommissioning works are carried out, or if maintenance is required. Any temporary impact on vessels using the TSS will not be increased by the WDA Infrastructure or associated activities.

354. The frequency of occurrence of increased third-party vessel to project vessel collision risk is considered to be Remote, with the severity of consequence considered to be Moderate. The resulting significance of effect is therefore considered **tolerable with mitigation** and **not significant** in EIA terms, and so ALARP.



13.11.2.3 Impact 3: Reduced Access to Local Ports and Harbour

355. Landfall location of the Offshore ECC will be in South Ayrshire, connecting near to Girvan. Although Girvan itself houses a marina, there are a limited number of local ports and harbours in the vicinity, with Ayr 15 nm to the north, and Stranraer 16 nm to the south, being the closest. In addition, there are no pilotage operations in proximity to the Offshore ECC.
356. There may be some temporary impact on Girvan during any surface works depending on where the final export cable route is located, or a longer-term impact depending on the water depths in which it is laid (if laid near Girvan). Under MGN 654 (MCA, 2021), any water depth reductions of more than 5% are required to be discussed with MCA which would manage any longer-term impact, but regardless these impacts would not be increased by the WDA Infrastructure or associated activities which will have no impact on access to Girvan. In addition, it is typical to include a marine licence condition requiring approval through MD-LOT where depths are proposed to be decreased by more than 5%.
357. The frequency of occurrence of reduced access to local ports and harbours is considered to be Remote, with the severity of consequence considered to be Minor. The resulting significance of effect is therefore considered as **broadly acceptable** and **not significant** in EIA terms, and so ALARP.

13.11.2.4 Impact 4: Reduction of Emergency Response Capability

358. It is not anticipated that there will be an additive impact on emergency response capability from the Offshore ECC past which has been described within the WDA only scenario in **Section 13.11**. No significant effects are anticipated.

13.11.2.5 Impact 5: Vessel-to-structure Allision Risk

359. Due to the lack of additional surface-piercing structures, there will be no additive impact on vessel-to-structure allision risk from the Offshore ECC. No significant effects are anticipated.

13.11.2.6 Impact 6: Reduction of Under Keel Clearance

360. The initial spatial extent of the impact is small given that a vessel must be in close proximity to a subsea cable with cable protection for a reduction to occur.
361. There is a greater risk of an under keel clearance interaction occurring within the Offshore ECC due to the reduced water depths, especially inshore near landfall. At these reduced water depths, typically only small craft would be transiting over the export cable(s), and these vessels tend to have shallower draughts.
362. Export cable(s) would have a typical burial depth of 1.0 – 3.0 m. Where cable burial is not practicable, alternative cable protection methods may be deployed which will be determined within the CBRA. The maximum height of any cable protection will be 3.0 m. The Applicant will follow the guidance contained in MGN 654 in relation to cable protection, namely that cable protection would not change the charted water depth by more than 5%, unless otherwise agreed with the MCA and NLB (noting it is also typical to include a marine licence condition requiring approval through MD-LOT where depths are proposed to be decreased by more than 5%). This aligns with the RYA Scotland’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 Scotland, 2019). With this guidance adhered to, the likelihood of an underwater allision is considered very low.



363. Should this percentage be exceeded, further assessment including consultation with the MCA and NLB may be required to determine whether any additional mitigation measures (e.g., post consent lighting and marking, charting, etc.) are necessary to ensure the safety of navigation. It is typical to include a marine licence condition requiring approval through MD-LOT where depths are proposed to be decreased by more than 5%.
364. The frequency of occurrence of reduction of under keel clearance is considered to be Extremely Unlikely, with the severity of consequence considered to be Minor. The resulting significance of effect is therefore considered as **broadly acceptable** and **not significant** in EIA terms, and so ALARP.

13.11.2.7 Impact 7: Anchor Interaction with Subsea Cables

365. Given that an interaction risk exists only where the anchoring occurs in proximity to a subsea cable, the hazard is local in nature and has a short temporal overlap – vessels enroute would be located over the export cable(s) for only a short period of time.
366. The burial of the export cable(s) and use of external cable protection as informed by the CBRA with a typical burial depth of 1.0 – 3.0 m would minimise the likelihood of an interaction occurring. The CBRA would also account for traffic volume and sizes.
367. It is anticipated that the charting of infrastructure including all subsea cables would inform the decision to anchor, as per Regulation 34 of SOLAS (IMO, 1974). This includes in an emergency anchoring situation.
368. Anchor dragging features a relatively wider extent than planned or unplanned anchoring. However, in such a circumstance it is likely that the anchor dragging would be stopped prior to any interaction with a subsea cable becoming possible.
369. The frequency of occurrence of anchor interaction with subsea cables is considered to be Extremely Unlikely, with the severity of consequence considered to be Moderate. The resulting significance of effect is therefore considered as **broadly acceptable** and **not significant** in EIA terms, and so ALARP.

13.11.2.8 Combined Assessment Summary

370. A summary of the significance of effect for each Shipping and Navigation risk assessed is provided in **Table 13.20**.



Table 13.20 Shipping and navigation combined assessment summary

Receptor/Topic	WDA Residual Effect	Offshore ECC Appraisal of Effects	OnTDA Appraisal of Effects	Combined Assessment
C/O&M/D Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk	Not Significant (Tolerable with Mitigation).	Not Significant (Tolerable with Mitigation).	N/A – no pathway to receptors.	No significant residual effects likely. Not Significant (Tolerable with Mitigation).
C/O&M/D Impact 2: Increased third-party vessel to project vessel collision risk	Not Significant (Tolerable with Mitigation).	Not Significant (Tolerable with Mitigation).	N/A – no pathway to receptors.	No significant residual effects likely. Not Significant (Tolerable with Mitigation).
C/O&M/D Impact 3: Reduced access to local ports and harbours	Not Significant (Broadly Acceptable).	Not Significant (Broadly Acceptable).	N/A – no pathway to receptors.	No significant residual effects likely. Not Significant (Broadly Acceptable).
C/O&M/D Impact 4: Reduction of emergency response capability	Not Significant (Tolerable with Mitigation).	N/A – no pathway to receptors.	N/A – no pathway to receptors.	No significant residual effects likely. Not Significant (Tolerable with Mitigation).
O&M Impact 5: Vessel to structure allision risk	Not Significant (Tolerable with Mitigation).	N/A – no pathway to receptors.	N/A – no pathway to receptors.	No significant residual effects likely. Not Significant (Tolerable with Mitigation).
O&M Impact 6: Reduction of under keel clearance	Not Significant (Broadly Acceptable).	Not Significant (Broadly Acceptable).	N/A – no pathway to receptors.	No significant residual effects likely. Not Significant (Broadly Acceptable).
O&M Impact 7: Anchor interaction with subsea cables	Not Significant (Broadly Acceptable).	Not Significant (Broadly Acceptable).	N/A – no pathway to receptors.	No significant residual effects likely. Not Significant (Broadly Acceptable).
* C = Construction, O&M = Operation and Maintenance, D = Decommissioning				

13.12 CUMULATIVE EFFECTS

13.12.1 Screening of Potential Cumulative Impacts

371. The first step in the CEA is the screening / identification of which whole-Project impacts could have a cumulative effect with other plans, projects and activities (described as ‘impact screening’). This information is set out in **Table 13.21**, together with a consideration of the confidence in the data that is available to inform a detailed assessment and the associated rationale.

Table 13.21 Potential cumulative impacts (impact screening)

Impact	Potential for Cumulative Impact	Data Confidence	Rationale
Construction			
Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk	Yes	High	There is potential for increased vessel displacement and increased third-party vessel to vessel collision risk as a result of construction activities alongside other offshore developments given potential for wider cumulative changes to vessel routeing patterns.
Impact 2: Increased third-party vessel to project vessel collision risk	Yes	High	There is potential for increased third-party vessel to project vessel collision risk as a result of construction activities alongside other offshore developments due to an increase in project vessels from other developments in the area (including those which may be RAM) as well as the potential for wider cumulative changes to vessel routeing patterns.
Impact 3: Reduced access to local ports and harbours	Yes	High	There is potential for reduced access to local ports and harbours as a result of construction activities alongside other offshore developments due to increased usage of local ports from other developments.
Impact 4: Reduction of emergency response capability	Yes	High	There is potential for reduction of emergency response capability as a result of construction activities alongside other offshore developments, with a greater number of developments increasing the potential for an incident at a development in proximity.
Impact 5: Vessel to structure allision risk	Yes	High	There is potential for increased vessel to structure allision risk as a result of construction activities alongside other offshore developments, given potential for wider cumulative changes to vessel routeing patterns.
Operation and Maintenance			
Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk	Yes	High	There is potential for increased vessel displacement and increased third-party vessel to vessel collision risk as a result of O&M activities alongside other offshore developments given potential for wider cumulative changes to vessel routeing patterns.
Impact 2: Increased third-party vessel to	Yes	High	There is potential for increased third-party vessel to project vessel as a result of O&M activities alongside other offshore developments due to an increase in



Impact	Potential for Cumulative Impact	Data Confidence	Rationale
project vessel collision risk			project vessels from other developments in the area (including those which may be RAM) as well as the potential for wider cumulative changes to vessel routeing patterns.
Impact 3: Reduced access to local ports and harbours	Yes	High	There is potential for reduced access to local ports and harbours as a result of O&M activities alongside other offshore developments due to increase usage of local ports from other developments.
Impact 4: Reduction of emergency response capability	Yes	High	There is potential for reduction of emergency response capability as a result of O&M activities alongside other offshore developments, with a greater number of developments increasing the potential for an incident at a development in proximity.
Impact 5: Vessel to structure allision risk	Yes	High	There is potential for increased vessel to structure allision risk as a result of O&M activities alongside other offshore developments, given potential for wider cumulative changes to vessel routeing patterns.
Impact 6: Reduction of under keel clearance	No	High	Due to the localised nature of this impact, there is not anticipated to be potential for reduction of under keel clearance as a result of O&M activities alongside other offshore developments.
Impact 7: Anchor interaction with subsea cables	No	High	Due to the localised nature of this impact, there is not anticipated to be potential for increased anchor interaction with subsea cables as a result of O&M activities alongside other offshore developments.
Decommissioning			
Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk	Yes	High	There is potential for increased vessel displacement and increased third-party vessel to vessel collision risk as a result of decommissioning activities alongside other offshore developments given potential for wider cumulative changes to vessel routeing patterns.
Impact 2: Increased third-party vessel to project vessel collision risk	Yes	High	There is potential for increased third-party vessel to project vessel as a result of decommissioning activities alongside other offshore developments due to an increase in project vessels from other developments in the area (including those which may be RAM) as well as the potential for wider cumulative changes to vessel routeing patterns.
Impact 3: Reduced access to local ports and harbours	Yes	High	There is potential for reduced access to local ports and harbours as a result of decommissioning activities alongside other offshore developments due to increase usage of local ports from other developments.
Impact 4: Reduction of emergency response capability	Yes	High	There is potential for reduction of emergency response capability as a result of decommissioning activities alongside other offshore developments, with a greater



Impact	Potential for Cumulative Impact	Data Confidence	Rationale
			number of developments increasing the potential for an incident at a development in proximity.
Impact 5: Vessel to structure allision risk	Yes	High	There is potential for increased vessel to structure allision risk as a result of decommissioning activities alongside other offshore developments, given potential for wider cumulative changes to vessel routeing patterns.

13.12.2 Screening of Other Plans, Projects and Activities

372. The second screening step in the CEA is the identification of the other plans, projects and activities that may result in cumulative impacts for inclusion in the CEA (described as ‘project screening’). This information is set out in **Appendix 13.1 Shipping and Navigation**, together with consideration of the relevant details of each, including current status (e.g. under construction), planned construction period, closest distance to the Project, status of available data and rationale for including or excluding from the assessment.
373. The project screening has been informed by the development of a CEA Long List which forms an exhaustive list of plans, projects and activities in a very large Study Area. The list has been appraised, based on the confidence in being able to undertake an assessment from the information and data available, enabling individual plans, projects and activities to be screened in or out. As described in **Section 13.10.3**, this has been undertaken using a tiered approach to provide a framework for placing relative weight on the potential for each plan or project to be included in the CEA for this topic.
374. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see **Appendix 13.1 Navigational Risk Assessment**). This further provides information regarding how information pertaining to other plans and projects is gained and applied to the assessment. Each project or plan has been considered on a case-by-case basis for screening in or out of this chapter’s assessment based upon data confidence, impact-receptor pathways and the spatial/temporal scales involved. For the CEA, other developments within 50 nm of the Project have been identified and screened for potential cumulative interactions.
375. Although there are no baseline offshore wind developments in direct proximity to the Project, there is one planned within 50 nm – the Malin Sea Offshore Windfarm, located 26 nm south of the WDA.
376. However, the location of this is such that there is likely to be limited interaction with traffic which may be displaced by the WDA. In addition, during consultation (see **Section 13.3**), when queried on cumulative concerns with the Malin Sea Offshore Windfarm, stakeholders agreed that distance was such that concerns were limited based on proximity. Thus, the Malin Sea Offshore Windfarm development is screened out of the cumulative risk assessment.
377. There could be tidal arrays located within 20 nm of the Project, with two planned projects in the vicinity - the Oran na Mara and Flex Marine Power developments located 13 nm and 14 nm east the WDA respectively, both in the Sound of Islay. There are therefore limited interactions with vessels between the Project and either tidal development, with none of the main routes identified in **Section 13.8.1.3** observed as passing through the Sound of Islay. In addition, if a vessel in the vicinity to the WDA did opt to transit through the Sound of Islay (or vice versa), there would be no



obstructions to them doing so from the Project. It is therefore considered that the Project is unlikely to have any significant cumulative impacts with the two tidal developments, noting that they will be smaller subsea developments not in proximity to any commercial routeing that may be deviated, and are so unlikely to lead to significant deviations.

378. As raised by MD-LOT and NLB during consultation, the Dubh Artach lighthouse is scheduled to undergo refurbishment works (to be completed by 2032), with potential overlap with construction of the WDA infrastructure. It is therefore considered that this may cumulative impact on navigational safety alongside the Project.

13.12.3 Cumulative Effects Assessment

379. All planned developments (see **Section 13.12.2**) with the potential to have a cumulative environmental impact with the Project have been considered. Following a screening process, the Dubh Artach lighthouse refurbishment works have been identified as requiring further assessment with regard to shipping and navigation. Due to the refurbishment works planned to be inclusive of the construction phase of the Project, only this phase has been considered within the CEA.

13.12.3.1 Cumulative Impact 1: Vessel Displacement and Increased Third-party Vessel to Vessel Collision Risk

380. Construction activities and the presence of WDA infrastructure in combination with Dubh Artach refurbishment works may result in the displacement of vessels from pre-existing routes and activities. This displacement may result in an increased cumulative risk of a collision between third-party vessels.
381. Due to the nature of the works, it is likely that any cumulative displacement associated with Dubh Artach will be temporary – i.e., limited to periods when vessels are actively working on the lighthouse, and spatially limited to the area around the operations. Due to the proximity of the lighthouse to the Project it is unlikely that a commercial vessel would opt to transit near to Dubh Artach at this time (as they are expected to avoid the buoyed construction area). For any smaller craft (such as fishing and recreational vessels) not wishing to transit in proximity to the lighthouse during this time, there will be no restrictions on transiting through the buoyed construction area of the Project assuming active safety zones are avoided.
382. Increased vessel encounters arising from displacement due to the simultaneous construction of Dubh Artach and the Project are therefore expected to be minimal. In the event of an encounter occurring however, involved vessels are expected to comply with international and flag state regulations including COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974).
383. The frequency of occurrence of cumulative vessel displacement and increased third-party vessel to vessel collision risk is considered to be Extremely Unlikely, with the severity of consequence considered to be Serious. The resulting significance of effect is therefore considered **tolerable with mitigation** and **not significant** in EIA terms, and so ALARP.

13.12.3.2 Cumulative Impact 2: Increased Third-party Vessel to Project Vessel Collision Risk

384. Cumulative increases in vessel activity associated with the Project in combination with the Dubh Artach lighthouse works could lead to increased cumulative collision rates in the area with third-party vessels.
385. Larger vessels would be expected to avoid the buoyed construction area and therefore by extension the refurbishment works. For smaller vessels, although the addition of vessels associated with both developments may lead to a minor increase in the potential for vessel encounters, the risk will be



managed by project-specific management procedures detailed in **Section 13.11.1.2**, in the event of an encounter between a third-party vessel and vessel for either under-construction development vessels are expected to comply with international and flag state regulations including COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974).

386. The frequency of occurrence of cumulative increased third-party vessel to project vessel collision risk is considered to be Extremely Unlikely, with the severity of consequence considered to be Moderate. The resulting significance of effect is therefore considered **broadly acceptable** and **not significant** in EIA terms, and so ALARP.

13.12.3.3 Cumulative Impact 3: Reduced Access to Local Ports and Harbours

387. Construction activities and the presence of WDA infrastructure in combination with Dubh Artach refurbishment works may result in the displacement of vessels from pre-existing routes, restricting access to ports/harbours.
388. Due to the location of the Dubh Artach lighthouse, it will likely be within the overarching extent of the buoyed construction area for the Project. The assessment considered for vessel routeing post-construction of the Project (see **Section 13.11.1.1**) is therefore applicable in this case – there is not expected to be an additional displacement effect noted when considering Dubh Artach alongside the Project.
389. In addition, with the closest port or harbour to the WDA being Port Ellen approximately 24 nm to the southeast, and from consultation with the Port of Glensanda noting that vessel transits will not be impacted by the Project (see **Section 13.3**), it is not expected that there will be an impact on port access cumulatively due to Dubh Artach and the Project.
390. The frequency of occurrence of cumulative reduced access to local ports and harbours is considered to be Remote, with the severity of consequence considered to be Minor. The resulting significance of effect is therefore considered **broadly acceptable** and **not significant** in EIA terms, and so ALARP.

13.12.3.4 Cumulative Impact 4: Reduction of Emergency Response Capability

391. The presence of WDA infrastructure and associated vessel activities may result in a cumulative increased likelihood of an incident occurring which requires an emergency response and may reduce access for surface and air SAR assets.
392. Due to the relatively few incidents in the area, and presence of the lighthouse itself being a mitigating factor against potential groundings in the vicinity, it is considered unlikely that there will be a notable increase in incidents on a cumulative basis.
393. Regardless, the relatively small area encompassing the lighthouse refurbishment works at any one time will not likely impact on emergency response vessels to undertake operations in the area. The Project will also have ERCoP procedures in place to further minimise impacts on emergency response capability, with this document to consider the presence of the lighthouse and related works.
394. The frequency of occurrence of cumulative reduction of emergency response capability is considered to be Extremely Unlikely, with the severity of consequence considered to be Serious. The resulting significance of effect is therefore considered **tolerable with mitigation** and **not significant** in EIA terms, and so ALARP.



13.12.3.5 Cumulative Impact 5: Vessel-to-structure Allision Risk

- 395. The WDA infrastructure will create cumulative allision risk to third-party passing vessels in combination with the Dubh Artach refurbishment works.
- 396. Although the potential for allision risk within the WDA will be localised to the structures related to the Project, there may be a minor increase in allision risk cumulatively with the WDA infrastructure and Dubh Artach works due to displacement of vessels closer to the WDA. As discussed in **Section 13.9**, marine lighting and marking of the WDA will be implemented including during construction in agreement with NLB post-consent to manage this risk.
- 397. The frequency of occurrence of cumulative increased vessel to structure allision risk is considered to be Remote, with the severity of consequence considered to be Moderate. The resulting significance of effect is therefore considered **tolerable with mitigation** and **not significant** in EIA terms, and so ALARP.

13.13 TRANSBOUNDARY EFFECTS

- 398. 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 as per **Section 13.11**, with further detail provided in **Appendix 13.1 Navigational Risk Assessment**. In particular, AIS is an internationally recognised and implemented means of broadcasting vessel information. As such, no transboundary impacts other than those already assessed in **Section 13.11** are anticipated.

13.14 INTER-RELATED AND INTERACTING IMPACTS

13.14.1 Inter-Relationships

- 399. **Table 13.22** below provides a summary of the key inter-relationships between shipping and navigation and other technical chapters and indicates where those issues have been addressed in the relevant chapters.

Table 13.22 Shipping and navigation inter-relationships

Topic and description	Related chapter(s)	Where addressed in this chapter	Rationale
Construction			
Vessel displacement and increased third-party vessel to vessel collision risk	Chapter 12 Commercial Fisheries	Section 13.11.1.1.1	Displacement from fishing grounds for commercial fishing vessels due to construction activities within the WDA.
Decommissioning			
Vessel displacement and increased third-party vessel to vessel collision risk	Chapter 12 Commercial Fisheries	Section 13.11.1.1.3	Displacement from fishing grounds for commercial fishing vessels due to decommissioning activities within the WDA.

13.14.2 Interactions

- 400. The impacts identified and assessed in this chapter have the potential to interact with each other. Areas of potential interaction between impacts are presented in **Table 13.23**, **Table 13.24**, and **Table 13.25** below. The impacts are assessed relative to each development phase (i.e. construction,



O&M, or decommissioning) to see if (for example) multiple construction impacts affecting the same receptor could increase the magnitude of impact upon that receptor.

401. A subsequent lifetime assessment has been undertaken which considers the impact interactions identified and the potential for impacts to effect receptors relevant to this chapter across all development phases (**Table 13.26**).



Table 13.23 Potential interaction between impacts – construction

Potential Interactions Between Construction Impacts					
	Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk	Impact 2: Increased third-party vessel to project vessel collision risk	Impact 3: Reduced access to local ports and harbours	Impact 4: Reduction of emergency response capability	Impact 5: Vessel to structure allision risk
Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk		Yes	Yes	Yes	Yes
Impact 2: Increased third-party vessel to project vessel collision risk	Yes		No	Yes	Yes
Impact 3: Reduced access to local ports and harbours	Yes	No		No	No
Impact 4: Reduction of emergency response capability	Yes	Yes	No		Yes
Impact 5: Vessel to structure allision risk	Yes	Yes	No	Yes	



Table 13.24 Potential interactions between impacts – operation and maintenance

Potential Interactions Between Operation and Maintenance Impacts							
	Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk	Impact 2: Increased third-party vessel to project vessel collision risk	Impact 3: Reduced access to local ports and harbours	Impact 4: Reduction of emergency response capability	Impact 5: Vessel-to-structure allision risk	Impact 6: Reduction of under keel clearance	Impact 7: Anchor interaction with subsea cables
Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk		Yes	Yes	Yes	Yes	No	No
Impact 2: Increased third-party vessel to project vessel collision risk	Yes		No	Yes	Yes	Yes	No
Impact 3: Reduced access to local ports and harbours	Yes	No		No	No	No	No
Impact 4: Reduction of emergency response capability	Yes	Yes	No		Yes	Yes	Yes
Impact 5: Vessel-to-structure allision risk	Yes	Yes	No	Yes		No	Yes
Impact 6: Reduction of under keel clearance	No	Yes	No	Yes	No		No



Potential Interactions Between Operation and Maintenance Impacts							
Impact 7: Anchor interaction with subsea cables	No	No	No	Yes	Yes	No	

Table 13.25 Potential interaction between impacts – decommissioning

Potential Interactions Between Decommissioning Impacts					
	Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk	Impact 2: Increased third-party vessel to project vessel collision risk	Impact 3: Reduced access to local ports and harbours	Impact 4: Reduction of emergency response capability	Impact 5: Vessel to structure allision risk
Impact 1: Vessel displacement and increased third-party vessel to vessel collision risk		Yes	Yes	Yes	Yes
Impact 2: Increased third-party vessel to project vessel collision risk	Yes		No	Yes	Yes
Impact 3: Reduced access to local ports and harbours	Yes	No		No	No
Impact 4: Reduction of emergency response capability	Yes	Yes	No		Yes
Impact 5: Vessel to structure allision risk	Yes	Yes	No	Yes	



Table 13.26 Potential interactions between impacts – phase and lifetime assessment

Receptor	Construction	Operation and Maintenance	Decommissioning	Phase Assessment	Lifetime Assessment
Commercial vessels	Not Significant (Tolerable with Mitigation)	Not Significant (Tolerable with Mitigation)	Not Significant (Tolerable with Mitigation)	No greater than individually assessed impact for each phase. It is likely that, over time, vessel Masters will become more accustomed to the Project, resulting in lower potential for risk. Therefore, there is not expected to be an appreciably greater impact when effects are considered together.	No greater than individually assessed impact. As with the phase assessment, due to the likelihood of vessels to become accustomed to the area, it is not expected that different impacts will interact across the different phases.
Fishing vessels	Not Significant (Tolerable with Mitigation)	Not Significant (Tolerable with Mitigation)	Not Significant (Tolerable with Mitigation)	No greater than individually assessed impact for each phase. Over time, Masters aboard fishing vessels will likely become more accustomed to the area as the phases progress. Therefore, there is not expected to be an appreciably greater impact when effects are considered together.	No greater than individually assessed impact. As with the phase assessment, due to the likelihood of vessels to become accustomed to the area, it is not expected that different impacts will interact across the different phases.
Recreational vessels	Not Significant (Tolerable with Mitigation)	Not Significant (Tolerable with Mitigation)	Not Significant (Tolerable with Mitigation)	No greater than individually assessed impact for each phase. Recreational sea users will likely become more accustomed to the area as the phases progress. Therefore, there is not expected to be an appreciably greater impact when effects are considered together.	No greater than individually assessed impact. As with the phase assessment, due to the likelihood of vessels to become accustomed to the area, it is not expected that different impacts will interact across the different phases.



Receptor	Construction	Operation and Maintenance	Decommissioning	Phase Assessment	Lifetime Assessment
Emergency vessels	Not Significant (Tolerable with Mitigation)	Not Significant (Tolerable with Mitigation)	Not Significant (Tolerable with Mitigation)	<p>No greater than individually assessed impact for each phase.</p> <p>Emergency vessels and SAR operators will likely become more accustomed to the area as the phases progress. Therefore, there is not expected to be an appreciably greater impact when effects are considered together.</p>	<p>No greater than individually assessed impact.</p> <p>As with the phase assessment, due to the likelihood of vessels to become accustomed to the area, it is not expected that different impacts will interact across the different phases.</p>



13.15 POTENTIAL MONITORING REQUIREMENTS

402. MGN 654 requires traffic monitoring be undertaken to confirm the findings of the NRA.

13.16 SUMMARY

403. **Table 13.27** presents a summary of the assessment of potential effects on shipping and navigation during the construction, O&M, and decommissioning phases of the Project.

404. The assessment has established that the WDA would result in effects of **broadly acceptable or tolerable with mitigation (not significant** in EIA terms) only.



Table 13.27 Summary of potential effects for shipping and navigation

Potential Impact	Receptor(s)	Relevant Embedded Mitigation Measures	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Additional Mitigation	Residual Significance of Effect	Proposed Monitoring	Combined Assessment	Cumulative Residual Significance of Effect
Construction										
Vessel displacement and increased third-party vessel to vessel collision risk	All vessels	M-19, M-25, M-26, M-28, M-31, M-35, M-36	Extremely Unlikely	Serious	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A
Increased third-party vessel to project vessel collision risk	All vessels	M-7, M-19, M-23, M-25, M-28, M-29, M-31, M-35, M-36,	Extremely Unlikely	Moderate	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A
Reduced access to local ports and harbours	All vessels	M-19, M-25, M-26	Remote	Minor	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A
Reduction of emergency response capability	All vessels	M-7, M-26, M-29, M-31, M-36	Extremely Unlikely	Serious	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A
Vessel-to-structure allision risk	All vessels	M-7, M-19, M-23, M-25, M-26, M-27, M-29, M-30, M-31, M-35, M-36	Remote	Moderate	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A
Operation and Maintenance										
Vessel displacement and increased third-party vessel to vessel collision risk	All vessels	M-19, M-25, M-26, M-28, M-31, M-35, M-36	Extremely Unlikely	Serious	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A
Increased third-party vessel to project vessel collision risk	All vessels	M-7, M-19, M-23, M-25, M-28, M-29, M-31, M-36,	Extremely Unlikely	Moderate	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A
Reduced access to local ports and harbours	All vessels	M-19, M-25, M-26	Extremely Unlikely	Minor	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A
Reduction of emergency response capability	All vessels	M-7, M-26, M-29, M-31, M-35, M-36	Extremely Unlikely	Serious	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A



Potential Impact	Receptor(s)	Relevant Embedded Mitigation Measures	Frequency of Occurrence	Severity of Consequence	Significance of Effect	Additional Mitigation	Residual Significance of Effect	Proposed Monitoring	Combined Assessment	Cumulative Residual Significance of Effect
Vessel-to-structure allision risk	All vessels	M-7, M-19, M-23, M-25, M-26, M-27, M-29, M-30, M-31, M-35, M-36	Remote	Moderate	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A
Reduction of under keel clearance	All vessels	M-7, M-8, M-19, M-25, M-26	Extremely Unlikely	Minor	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A
Anchor interaction with subsea cables	All vessels	M-8, M-19, M-25, M-26,	Extremely Unlikely	Moderate	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A
Decommissioning										
Vessel displacement and increased third-party vessel to vessel collision risk	All vessels	M-19, M-25, M-26, M-28, M-31, M-35, M-36	Extremely Unlikely	Serious	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A
Increased third-party vessel to project vessel collision risk	All vessels	M-7, M-19, M-23, M-25, M-28, M-29, M-31, M-36,	Extremely Unlikely	Moderate	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A
Reduced access to local ports and harbours	All vessels	M-19, M-25, M-26	Remote	Minor	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A	Broadly Acceptable, not significant	N/A
Reduction of emergency response capability	All vessels	M-7, M-26, M-29, M-31, M-35, M-36	Extremely Unlikely	Serious	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A
Vessel-to-structure allision risk	All vessels	M-7, M-19, M-23, M-25, M-26, M-27, M-29, M-30, M-31, M-35, M-36	Remote	Moderate	Tolerable with Mitigation, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A	Tolerable with Mitigation and ALARP, not significant	N/A



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