Bowdun Offshore Wind Farm, Offshore EIA Report

Volume 2, Chapter 14: Shipping and Navigation

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Glossary

Defined Term	Definition
Additional Mitigation	Also referred to as secondary mitigation which is defined by The Institute of Sustainability and Environmental Professionals (ISEP) (formerly Institute of Environmental Management and Assessment (IEMA)) as: Actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent, or through inclusion in the Environmental Impact Assessment (EIA) Report (sic).
Adverse Weather	Severe weather that creates potentially unsafe conditions for vessel transits.
Allision/Contact	Allision in shipping and navigation refers to the impact of a moving vessel with a stationary object, such as a Wind Turbine. It is distinct from a collision, which involves two moving vessels.
Anchorage	A designated area where ships lower their anchors to remain in position.
Applicant (the)	Bowdun Offshore Wind Farm Limited (BOWFL).
Array Area	The Array Area is the area in which the Offshore Generation Assets will be located.
As Low as Reasonably Practicable (ALARP)	The principle that risk should be reduced as far as possible before further reduction is disproportionate to the costs of doing so.
Automatic Identification System (AIS)	A system by which vessels automatically broadcast their identity and key statistics including location, destination, length, speed and current status. Most commercial vessels and European Union fishing vessels over 15 metres (m) in length are required to carry AIS.
Baseline	The status of the environment without the Proposed Development in place.
Collision (Shipping and Navigation)	Collision refers to the impact between two moving vessels, or a vessel and an object in motion. It differs from allision, which involves a moving vessel striking a stationary object.
Cumulative Effects	The effects of the Proposed Development assessed together with effects from the Onshore Infrastructure forming the Project as well as one or more different projects on the same receptor/resource.
Displacement/ Deviation (Shipping and Navigation)	An impact that occurs when a vessel is forced away from their typical route due to activities associated with the construction, operation and maintenance, and/or decommissioning of the Proposed Development due to the Offshore Infrastructure.
Draught	The maximum depth of any floating body.
Effect	Term used to express the consequence of an impact (i.e. the result of change or changes on specific environmental resources or receptors). The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity of the receptor or resource in accordance with defined significance criteria.

Defined Term	Definition
Embedded Mitigation	Measures that are adopted as part of the Proposed Development and therefore assessed within the EIA. The proposed approach for the EIA for the Proposed Development is that Embedded Mitigation includes both primary mitigation and tertiary mitigation. These are defined by the ISEP as follows: Primary: Modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project, and do not require additional action to be taken. Tertiary: Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects.
Environmental Impact Assessment (EIA)	Process for the assessment of likely significant environmental effects of a project on the physical, biological and human environment during construction, Operation and Maintenance (O&M) and decommissioning.
Environmental Impact Assessment Regulations (EIA Regulations)	Terminology used in this Offshore EIA Report to refer to three sets of regulations: • The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017; • The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017; and • The Marine Works (Environmental Impact Assessment) Regulations 2007.
Export Cable Corridor	The area seaward of MHWS which connects the Array Area with the Landfall within which the Offshore Export Cables will be installed.
Flag State	A Flag State is the state chosen by merchant ships to be registered in, so that the vessel is bound to carry the flag of that state and comply with that state's rules and regulations.
Formal Safety Assessment (FSA)	A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity.
Grounding	Vessel makes contact with the seabed/shoreline or underwater assets.
High Voltage Alternating Current (HVAC)	A system of power transmission and distribution that utilises alternating current at voltages typically exceeding 1000 volts, as defined by the International Electrotechnical Commission (2015). HVAC systems are designed to efficiently deliver electricity over long distances with minimal losses, leveraging transformers to modify voltage levels.
Impact	A change caused by an action that occurs during a project's lifetime.
Inter-Array Cables (IAC)	Cables which link the Wind Turbines to each other and with the OSPs.
Inter-Related Effects	The potential effects of multiple impacts from the construction, O&M and decommissioning of the Project, affecting one receptor.
Interconnector Cables	Cables which will connect individual OSPs to each other to provide redundancy against cable failure elsewhere.
Intertidal Area	The area between MHWS and Mean Low Water Springs (MLWS).
Landfall	The area in which the Offshore Export Cables make landfall and is also the transitional area between the Offshore Transmission Assets and the Onshore Transmission Assets. Located in the Intertidal Area at Benholm.

Defined Term	Definition
Marine Directorate (MD)	The Marine Directorate of the Scottish Government, formerly known as Marine Scotland. The planning and licensing authority for Scotland's seas and custodian of Scotland's National Marine Plan (NMP). The Marine Directorate - Licensing Operations Team (MD-LOT) are specifically responsible for managing Section 36 Consent and Marine Licence Applications seaward of MHWS.
Marine Guidance Note (MGN)	A system of guidance notes issued by the Maritime and Coastguard Agency (MCA) which provide significant advice relating to the improvement of the safety of shipping and of life at sea, and to prevent or minimise pollution from shipping.
Marine Licence	A Marine Licence permits the undertaking of different activities in the marine environment, including construction, the deposition or removal of substances or objects, and dredging. The Marine (Scotland) Act 2010 requires Marine Licences to be obtained for licensable activities taking place within Scottish Territorial Seas (MHWS to 12 nm). The Marine and Coastal Access Act (MCAA) 2009 requires a Marine Licence to be obtained for licensable marine activities within the Scottish offshore region (12 nm to 200 nm).
Master	The designated person in charge of a ship, its crew, passengers and cargo.
Maximum Design Scenario (MDS)	The scenario within the design envelope likely to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor.
Mean High Water Springs (MHWS)	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mitigation	Measures to avoid, prevent, reduce or control effects on the environment. See also definitions for Embedded Mitigation and Additional Mitigation.
Offshore Application	Term used to refer to the applications associated with the Proposed Development. The Applicant will apply for: • A Section 36 Consent under the Electricity Act 1989; and • Marine Licence(s) under Marine Scotland Act 2010 and Marine and Coastal Access Act 2009.
Offshore Environmental Impact Assessment (EIA) Report (hereafter, 'Offshore EIA Report')	Document prepared to report the findings of the EIA for the Proposed Development and produced in accordance with the EIA Regulations. The Offshore EIA Report is submitted to support the Offshore Application for the Proposed Development, and to comply with EIA Regulations.
Offshore Export Cables	Subsea cables used to transmit electricity generated offshore by the Wind Turbines from the OSPs to shore. The Transition Joint Bay (TJB) is the location where the Offshore Export Cables terminate, and the onshore cabling begins.
Offshore Generation Assets	The infrastructure of the Proposed Development required to generate electricity comprising of the Wind Turbines, Wind Turbine foundations and associated infrastructure (e.g. IACs).
Offshore Infrastructure	All of the Offshore Infrastructure associated with the Proposed Development that is located seaward of MHWS, comprising the Offshore Generation Assets and the Offshore Transmission Assets.

Defined Term	Definition
Offshore Scoping Report	The report that presents the findings of the EIA scoping process undertaken for the Proposed Development with the purpose of obtaining a Scoping Opinion. The Offshore Scoping Report defines what is intended to be assessed and reported as part of the EIA.
Offshore Substation Platform(s) (OSPs)	OSPs comprise the support structure, topside and electrical components used for collecting and/or converting electricity generated by the Wind Turbines for transmission by the Offshore Export Cables.
Offshore Transmission Assets	The infrastructure of the Proposed Development required to transmit the generated electricity comprising of the OSPs, Offshore Export Cables and associated infrastructure up to MHWS.
Operation and Maintenance (O&M)	The phase of the Proposed Development following completion of construction. This phase of development includes routine inspections, repairs and replacement of infrastructure and equipment (including Interconnector Cables and IACs), Scour Protection replenishment or replacement, major component replacement, painting and/or other coating works, removal of marine growth, and replacement of access ladders.
Passage Plan	A detailed description of a vessel's voyage from start to finish, including the route and hazards likely to be encountered along the way.
Port or Harbour	A maritime facility compromising of one or more wharves or loading areas where ships load and discharge cargo or passengers.
Piling	The action of installing piles: installation can use various methodologies, the most common of which are impact piling (in which the piles are struck by a "hammer") and drilling (during which a hole is drilled into the seafloor, the drilling tool is removed, and the pile is slotted into that hole).
Practice and Exercise Area (PEXA)	Term used to describe an offshore area used by the military for practice and exercise drills, including submarine exercises and firing practice.
Project (the)	An overarching term for the Bowdun Offshore Wind Farm (Bowdun OWF) comprising the offshore and onshore infrastructure required to generate and transmit electricity from the Array Area to the onshore Grid Connection Point (GCP). The Project includes the Offshore Generation Assets, the Offshore Transmission Assets and the Onshore Transmission Assets.
Project Design Envelope (PDE)	A description of the range of possible elements that make up the design options for the Proposed Development under consideration when the exact engineering parameters are not yet known.
Proposed Development	Term used to define the Offshore Infrastructure associated with the Project seaward of MHWS for which consent is being sought. Further details of the parameters are included in Volume 1, Chapter 3: Project Description.
Safety Zones	An area extending a maximum of 500 m from the central point of a subsea installation in which other vessels are prohibited from entering, except in circumstances outlined within Section 96 of the Energy Act, 2004.
Scoping Opinion	A document produced by MD-LOT which is issued in response to submission and review of the Offshore Scoping Report. The Scoping Opinion is supported with feedback and advice from consultees, which details what is expected to be included in the Offshore EIA Report and what can be scoped out of the EIA process.

Defined Term	Definition
Scoping Workshop	A series of sessions preceding the finalisation of the Offshore Scoping Report to provide an opportunity for the Applicant to consult on the draft scope and for stakeholders to request additional information on key issues.
Scottish Marine Area	The area of sea within the seaward limits of the territorial sea of the United Kingdom adjacent to Scotland as defined by the Marine (Scotland) Act 2010.
Scottish Ministers (the)	The decision makers with regard to Marine Licence(s) and Section 36 Consent applications in Scottish Offshore Waters and Scottish Marine Area.
Scottish Offshore Waters	The area of sea beyond 12 nm but within the Scottish Exclusive Economic Zone (EEZ) up to 200 nautical miles from the coast.
Scour Protection	Protective materials installed to avoid sediment being eroded away from the base of the foundations and/or buried subsea cable due to the flow of water.
Section 36 Consent	Scottish Ministers' consent under Section 36 of the Electricity Act 1989 required to permit the generation and operation of an energy generation station.
Sectoral Marine Plan (SMP)	A plan developed by the Scottish Government which provide the strategically planned spatial footprint for offshore wind development in Scotland.
Significance	Effect factor that is determined by the magnitude of impact along with the sensitivity of the receptor.
Site Boundary	The boundary within which all elements of the Proposed Development will be located. The Site Boundary comprises the Array Area and Export Cable Corridor which ends at MHWS.
Study Area	For each environmental topic, the baseline environment will be characterised, and the potential environmental impacts will be described within a topic-specific study area. Specific study areas are defined for each topic and are based on the maximum spatial extent across which potential impacts of the Project may be experienced by the relevant receptors (i.e. Zone of Influence).
Thistle Wind Partners (TWP)	Company established for the development of the Project.
Transition Joint Bay (TJB)	Used to connect the Offshore Export Cables with the onshore export cables. These are typically concrete lined and are located above MHWS.
Vessel Traffic Services (VTS)	A marine traffic monitoring system established by port authorities to manage vessel movements and safety.
Wind Turbines	Structures comprising of a tubular tower, rotor blades, and a nacelle which houses the Wind Turbine generator.

Acronyms

Acronym	Definition
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
AtoN	Aids to Navigation
BWEA	British Wind Energy Association
CaP	Cable Plan
CBRA	Cable Burial Risk Assessment
CEA	Cumulative Effects Assessment
CES	Crown Estate Scotland
CFLO	Company Fisheries Liaison Officer
CNSE	Central North Sea Electrification
COLREGS	The Convention on the International Regulations for Preventing Collisions at Sea
DSLP	Development Specification and Layout Plan
DfT	Department for Transport
EEA	European Economic Area
EGL	Eastern Greenlink
EIA	Environmental Impact Assessment
EMODNet	European Marine Observation and Data Network
ERCoP	Emergency Response Cooperation Plan
EU	European Union
FLO	Fisheries Liaison Officer
FMMCP	Fisheries Mitigation, Monitoring and Communication Plan
FSA	Formal Safety Assessment
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HAZID	Hazard Identification
HDD	Horizontal Directional Drilling
HM	His Majesty's
HMCG	His Majesty's Coast Guard
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAC	Inter-Array Cable
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IMO	International Maritime Organization
INTOG	Innovation and Targeted Oil and Gas
LAT	Lowest Astronomical Tide
LMP	Lighting and Marking Plan

Acronym	Definition
MAIB	Marine Accident Investigation Branch
MCA	Maritime & Coastguard Agency
MD-LOT	Marine Directorate – Licensing Operations Team
MDS	Maximum Design Scenario
MGN	Marine Guidance Note
MHWS	Mean High Water Spring
MoD	Ministry of Defence
MSC	Marine Safety Committee
NFFO	National Federation of Fishermen's Organisations
NLB	Northern Lighthouse Board
NMP	National Marine Plan
NRA	Navigational Risk Assessment
NSVMP	Navigational Safety and Vessel Management Plan
NSTA	North Sea Transition Authority
NtM	Notice to Mariners
OFTO	Offshore Transmission Owners
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
O&M	Operation and Maintenance
PDE	Project Design Envelope
PEXA	Practice and Exercise Area
PIANC	Permanent International Association of Navigation Congresses
RNLI	Royal National Lifeboat Institution
RYA	Royal Yachting Association
SAR	Search and Rescue
SFF	Scottish Fisherman's Federation
SOLAS	International Convention for the Safety of Life at Sea
SSE	Scottish and Southern Electricity
SWFPA	Scottish White Fish Producers Association
TWP	Thistle Wind Partners Limited
UK	United Kingdom
UKC	Under Keel Clearance
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea
VHF	Very High Frequency
VTS	Vessel Traffic Survey

Table of Units

Units	Definition
%	Percent
‘	Minute
£	GBP
°	Degree
°C	Degree Celsius
cm	Centimetre
GT	Gross Tonnes
GW	GigaWatt
kg	Kilogram
km	Kilometre
km²	Square kilometre
kts	knots
m	Metre
m/s	Metre per second
m²	Square Metre
mLAT	Metres above/below Lowest Astronomical Tide
mm	Millimetre
MW	MegaWatt
nm	Nautical mile

14 Shipping and Navigation

14.1 Introduction

14.1.1 This chapter of the Offshore Environmental Impact Assessment (EIA) Report, prepared by NASH Maritime, presents the assessment of the likely significant environmental effects on shipping and navigation, that may potentially occur as a result of the Proposed Development during the construction, Operation and Maintenance (O&M) and decommissioning phases.

14.1.2 The assessment presented is informed by the following technical chapters:

- Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment;
- Volume 3, Technical Appendix 14.2: Shipping and Navigation Vessel Traffic Survey Report 2024;
- Volume 3, Technical Appendix 14.3: Shipping and Navigation Vessel Traffic Survey Report 2025;
- Volume 2, Chapter 13: Commercial Fisheries;
- Volume 2, Chapter 15: Aviation and Radar;
- Volume 2, Chapter 16: Infrastructure and Other Users and
- Volume 2, Chapter 18: Socio-economic, Tourism and Recreation.

14.2 Shipping and Navigation Study Area

14.2.1 The Array Area of the Proposed Development is located 38 km offshore at its closest point, with a total lease area of 187 km^2. Water depths within the Array Area range from −55 m to −75 m Lowest Astronomical Tide (LAT), with a small region of deeper water (-91 m LAT) located near the northwestern corner of the Array Area. Average water depths across the Array Area are approximately −65 m LAT. The Offshore Export Cable Corridor will include a maximum of three High Voltage Alternating Current (HVAC) Offshore Export Cables, each with a length of up to 70 km and will make Landfall at Benholm, Aberdeenshire. The Offshore Export Cables will be brought onshore via three cable ducts constructed using a trenchless technique such as Horizontal Directional Drilling (HDD) or pipe-jacking.

14.2.2 The Shipping and Navigation Study Area is shown in Figure 14.1 comprises the Array Area and a 10 nm (18.52 km) buffer, and the Offshore Export Cable Corridor and a 3 nm (5.56 km) buffer.

14.2.3 The Shipping and Navigation Study Area is consistent with industry best practice (Maritime & Coastguard Agency (MCA), 2021a) as applied to previous offshore renewable shipping and navigation studies (Buchan Offshore Wind Limited 2023; Mainstream Renewable Power Limited, 2019; Scottish and Southern Electricity (SSE) Renewables, 2024; Mona Offshore Wind Limited, 2023; Morgan Offshore Wind Limited, 2023; Morecambe Offshore Wind Limited, 2023). The Shipping and Navigation Study Area provides further context to vessel traffic and routeing in proximity to the Proposed Development and allows for identification of key navigational features affecting vessel traffic.

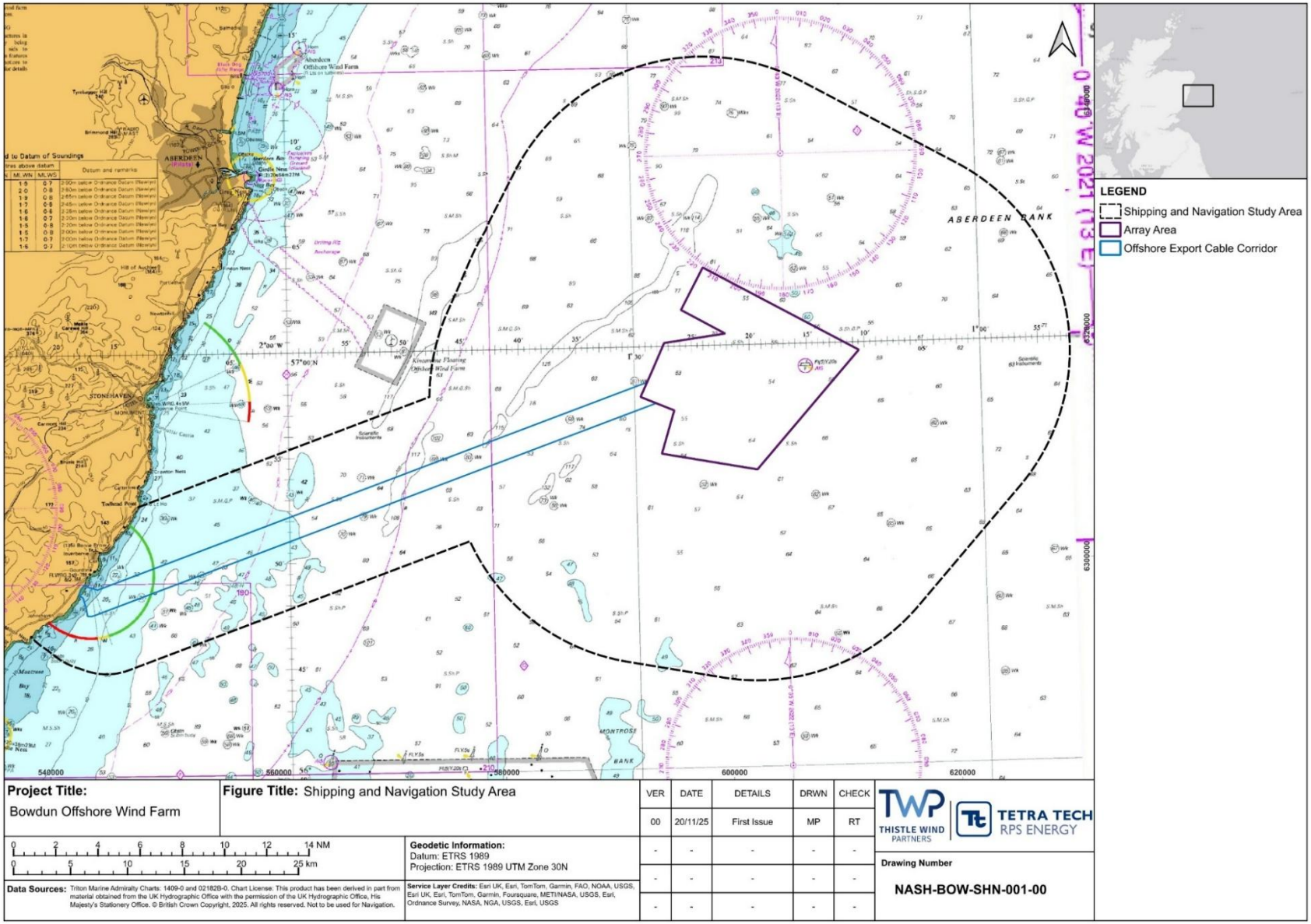

Figure 14.1: Shipping and Navigation Study Area

14.3 Legislative and Policy Context

14.3.1 The overarching policy and legislation applicable to the Proposed Development is presented in Volume 1, Chapter 2: Policy and Legislation. A summary of the legislative provisions relevant to shipping and navigation are provided in Table 14.1 below, with other relevant policy provisions set out in Table 14.2. These are summarised here with further detail presented in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

Table 14.1: Summary of Legislation Relevant to Shipping and Navigation

Summary of Relevant Legislation	How and Where Considered in the Offshore EIA Report
United Nations Convention on the Law of the Sea (UNCLOS) (UN, 1982) **UNCLOS is an international agreement that establishes a legal framework for all marine and maritime activities.**	Article 60(7) states that *'Artificial islands, installations and structures and the Safety Zones around them may not be established where interference may be caused to the use of recognised sea lanes essential to international navigation.'* As per Article 22(4), *'The coastal state shall clearly indicate such sea lanes and traffic separation schemes on charts to which due publicity shall be given'.* Any traffic routeing schemes in the area have been considered in Section 5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.
Convention on the International Regulations for Preventing Collisions at Sea (COLREGS) (International Maritime Organization (IMO), 1972/77) **A set of regulations which establish the conduct of vessels in any condition of visibility, and the correct actions to take when a vessel is in close quarters with another vessel.**	Rule 8 Part (a) states that *'Any action taken to avoid collision shall be taken in accordance with the Rules of the Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship'.* Similarly, Rule 19 Part (b) states that *'Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate manoeuvre'.* Therefore, collision risks and avoidance provisions are considered and assessed in Section 8 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.
International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974) **An international maritime treaty that concerns the safety of merchant ships.**	Regulation 33 states that *'The master of a ship at sea which is in a position to be able to provide assistance on receiving information from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance'.* This is followed by Regulation 34, which states that *'Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned'.*

Table 14.2: Summary of Policy relevant to Shipping and Navigation

Summary of Relevant Policy	How and Where Considered in the Offshore EIA Report
United Kingdom (UK) Marine Policy Statement, His Majesty's (HM) Government, 2011) **Paragraph 3.4.7 states that:** ***'Increased competition for marine resources may affect the sea space available for the safe navigation of ships. Marine plan authorities and decision makers should take into account and seek to minimise any adverse impacts on shipping activity, freedom of navigation and navigational safety and ensure that their decisions are in compliance with international maritime law. Marine Plan development and individual decisions should also take account of environmental, social and economic effects and be in compliance with international maritime law. Marine plan authorities will also need take account of the need to protect the efficiency and resilience of continuing port operations, as well as further port development.'***	Where relevant, the impacts to vessel traffic and routeing have been considered in Section 8, Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment and within Sections 14.10 and 14.12 of this chapter.
Scotland's National Marine Plan (NMP) (Scottish Government, 2015)	
Transport 1: ***'Navigational safety in relevant areas used by shipping now and in the future will be protected, adhering to the rights of innocent passage and freedom of navigation contained in UNCLOS....'***	Impacts to passenger and commercial vessel traffic, routeing (where relevant) during Proposed Development construction, O&M and decommissioning have been assessed in Section 14.10. Impacts to commercial fishing activity and routeing are considered in Section 14.10. Impacts to recreational vessels and routeing are considered in Section 14.10. Impacts on access to ports (where relevant) have been considered in Section 14.10. Embedded Mitigations are detailed in Section 14.9, with Additional Mitigation identified as needed under the Formal Safety Assessment (FSA) in the relevant impact section of this chapter and Section 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. A future case traffic profile is considered in Section 14.6 and Section 7 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.
Transport 2: ***'Marine development and use should not be permitted where it will restrict access to, or future expansion of, major commercial ports or existing or proposed ports and harbours.'***	
Transport 3: ***"Ferry routes and maritime transport to island and remote mainland areas provide essential connections and should be safeguarded from inappropriate marine development. Developments will not be consented where they will unacceptably interfere with lifeline ferry services."***	
Transport 6: ***"Developers should ensure displacement of shipping is avoided where possible to mitigate against potential increased journey lengths (and associated fuel costs, emissions and impact on journey frequency)."***	

Guidance

Marine Guidance Note 654

14.3.2 The principal guidance document for the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) is the MCA's Marine Guidance Note (MGN) 654 (MCA, 2021a). MGN 654 describes the potential shipping and navigation issues which should be considered by developers when proposing Offshore Renewable Energy Installations (OREIs). Annex 1 of the MGN (MCA, 2021b) provides a detailed methodology for assessing the marine navigational safety risks of OREIs which has informed the assessment methodology.

14.3.3 The IMOs FSA process has been applied within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. The guidelines for FSA were approved in 2002 and were most recently amended in 2018 by Marine Safety Committee (MSC)-MEPC.2/Circ.12/Rev.2 (IMO, 2018). The FSA is a structured and systematic methodology, aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and, if appropriate, cost-benefit assessment. The IMO FSA guidance defines a hazard as '*a potential to threaten human life, health, property or the environment*', the realisation of which results in an incident or accident. The potential for a hazard to be realised (i.e. likelihood) can be combined with an estimated or known consequence of outcome and this combination is termed 'risk'.

14.3.4 MGN 372 Amendment 1 Safety of Navigation: Guidance to Mariners Operating in Vicinity of UK OREIs (MCA, 2022) provides guidance to support passage planning near OREIs off the UK coast. This guidance has been used to inform the risk assessment regarding safe passing distances and the adequacy of corridors for navigation passed or through the Proposed Development areas.

14.3.5 The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162 The Marking of Offshore Man-Made Structures (IALA, 2021) provides guidance on the lighting and marking arrangements for Offshore Wind Farms (OWFs). This guidance has been considered as the accepted standard for UK OWF and informs the NRA (Volume 3, Technical Appendix 14.1: Navigational Risk Assessment). IALA G1185 Enhancing the Safety and Efficiency of Navigation Around OREIs (IALA, 2024) provides an updated summary of IALA's good practices for managing navigation safety and planning in the vicinity of OREIs, specifically on the topics of navigational safety, incident response and maritime spatial planning. IALA G1121 Navigational Safety Within Marine Spatial Planning (IALA, 2017) outlines how navigational safety considerations should be integrated into marine spatial planning to ensure safe and efficient maritime operations.

14.3.6 The Royal Yachting Association (RYA) Position of Offshore Renewable Energy Developments: Wind Energy (RYA, 2019a) describes the key impacts of OWFs on recreational activities supporting to inform the assessment of Impact 9 in Section 14.10.

14.3.7 Permanent International Association of Navigation Congresses (PIANC) WG161 Interaction Between OWFs and Maritime Navigation (PIANC, 2018) provides guidelines and recommendations on impacts on mitigations for shipping routes near OWFs, supporting to inform the assessment of Impact 2 in Section 14.10.

14.3.8 Nautical Institute (2013) The Shipping Industry and Marine Spatial Planning provides guidance on benefits and risks of marine spatial planning for shipping and navigation supporting to inform the assessment of impacts in Section 14.10.

14.3.9 G+ Integrated Offshore Emergency Response (2019) Good practice guidelines for offshore renewable energy developments provides guidance on emergency response for OWFs supporting to inform the assessment of Impact 5 in Section 14.10.

14.3.10 The Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020) provides the strategic framework for offshore wind development in Scottish waters, identifying suitable options and setting the wider policy and spatial planning context. While the Plan does not prescribe technical standards for navigation safety, it establishes the basis for considering both cumulative and project-specific impacts on navigation. This Plan therefore acknowledges that as part of the policy context, recognising the need to address cumulative navigational risk covered in Section 14.12 alongside site-specific assessment.

14.4 Consultation

14.4.1 The approach to consultation for the Proposed Development is set out in Volume 1, Chapter 5: Consultation and Engagement. A summary of the issues raised during consultation activities undertaken to date specific to shipping and navigation is presented in Table 14.3, together with how these issues have been considered in the production of this assessment. Further detail is presented within Volume 1, Chapter 5: Consultation and Engagement, Volume 3, Technical Appendix 5.1: Consultation Log and Volume 3, Technical Appendix 5.2: Pre-Application Consultation Report.

14.4.2 Consultation letters were sent to relevant shipping and navigational stakeholders to provide information on the Proposed Development and request input into the NRA process. Responses to this letter were received from RYA Scotland, Kincardine OWF, the MCA, Northern Lighthouse Board (NMP), UK Chamber of Shipping (UKCoS), Ministry of Defence (MoD), Seagreen OWF and the Scottish Fisherman's Federation (SFF). Details of these responses are shown in in Table 14.3. A response was also received from the Port of Aberdeen noting confirmation of the letter and inability to attend the Hazard Identification (HAZID) workshop and since no issues or further considerations were raised this response is not shown in Table 14.3.

14.4.3 In addition to the letters, dedicated consultation meetings were held with the NLB, UKCoS and Kincardine OWF, as detailed in Table 14.3. The MCA, RYA and Fisheries Organisations chose to only attend the HAZID workshop. The HAZID workshop was ultimately attended by the MCA, NLB, UKCoS, RYA Scotland, SFF, Scottish Whitefish Producers Association (SWFPA), Ossian OWF, Morven North OWF, Morven South OWF and Kincardine OWF.

Table 14.3: Summary of Key Consultation Issues Raised During Consultation Activities Undertaken for the Proposed Development Relevant to Shipping and Navigation

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
Scoping Workshop			
25/04/2024	Scoping Workshop MCA	The MCA highlighted concern over the cumulative impacts with Morven North, Morven South and Ossian OWF projects.	Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment follows the MCA's MGN654 guidance and IMO FSA methodology. Cumulative considerations are made within Section 10 of the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) and within this chapter in Section 14.12, including cumulative impact assessment with Morven North, Morven South and Ossian OWFs, together with other offshore developments.
	Scoping Workshop NLB	The NLB raised the need for marking array edges if turbines are removed for maintenance. The NLB also highlighted the statutory duty to mark wrecks accordingly and the risks of vessel entanglement if floating turbine moorings were to be used. The NLB were also interested in cumulative maintenance impacts.	The final Lighting and Marking Plan (LMP) developed post-consent will include contingency planning for marking Array Area boundaries during major maintenance works. Floating Wind Turbines and vessel wreck entanglement risks on mooring lines are no longer a concern as the Project will have fixed Wind Turbines only. Cumulative effects have been assessed within Section 14.12 of this chapter, including for the O&M phase of the Proposed Development.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
	Scoping Workshop SFF	It was noted that European Marine Observation and Data Network (EMODnet) data underrepresents fishing activity; and that seasonal activity is not captured by 14-day surveys. Requested inclusion of SFF data (screenshots only). Queried implications of base port selection on Study Area.	The limitations of EMODnet and short term surveys were acknowledged. The NRA (Volume 3, Technical Appendix 14.1: Navigational Risk Assessment) has also incorporated analysis of 12-month Automatic Identification System (AIS) dataset, together with four vessel traffic surveys and stakeholder consultation to capture information on non-AIS seasonal fishing patterns. Confidential information of plotter screenshots provided by SFF were also considered when undertaking relevant risk and impact assessments. Base ports are not yet defined and will be determined post-consent.
	Scoping Workshop UKCoS	Rig movements and navigational constraints should be considered in NRA due to proximity to Port of Aberdeen.	Rig movements and their supporting vessels were considered within the 12-month AIS dataset and assessed in NRA for navigational constraints Section 6.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Consideration and consultation with Kincardine OWF was also considered for towage of their floating Wind Turbine assets and is described below on 27/08/2025.
15/08/2024	MGN Guidance Discussion	Presentation of potential turbine locations and discussion regarding lines of orientation	Final Array Area layout will be confirmed through consultation with MCA and NLB post-consent via the Development Specification and Layout Plan (DSLP), as per the Embedded Mitigation

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
Scoping Opinion			
16/09/2024	Letter Response MCA	The MCA emphasised the need to consider the impact on commercial and recreational craft specifically, and to also consider routing deviations, particularly in adverse weather, and the cumulative effects on shipping routes. MCA noted that the implications of the site size and location on Search and Rescue (SAR) resources and Emergency Response Cooperation Plan (ERCoP) should be considered. MCA highlighted that attention should be paid to cabling routes and, where appropriate, burial depth for which a Burial Protection Index study should be completed.	Routing impacts in both a Project-alone scenario and a cumulative scenario have been considered in Section 8 and Section 10 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment, respectively. Adverse weather routeing is presented in Section 6.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. The impact of the Proposed Development on commercial and recreational vessels has been considered is Section 8.2 and Section 8.10 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment, respectively. The impact of the Proposed Development on SAR has been considered in Section 8.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment, and an ERCoP will be developed in consultation with the MCA post-consent as per Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Impacts related to the Offshore Export Cables are considered in the following sections of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment: Section 8.2, Section 8.5, Section 8.8 and Section 8.10. Potential hazards within the Offshore Export Cable Corridor are presented in Paragraph 9.5.9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
20/09/2024	Letter Response NLB	NLB requested that consideration is given within the Offshore EIA Report to the potential impact that a wreck (either that of a vessel or Wind Turbine) could have upon navigation, both within the Array Area and the immediate vicinity.	Floating and hybrid Wind Turbines have been ruled out following refinement of the Project Design Envelope (PDE). However, a vessel wrecking within the Array Area is considered within the 'worst credible' scenario for Wind Turbine allision (Section 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment).
02/10/2024	Letter Response RYA Scotland	RYA Scotland noted that the failure or loss of Aid to Navigation (AtoN) could pose an additional risk and should be considered.	Failure of AtoNs is considered as a potential contributor to an allision event in Section 8.4 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.
15/10/2024	Letter Response UKCoS	The Chamber recommended that the NRA should provide a detailed analysis of shipping traffic, accounting for seasonal variations in commercial and recreational vessel activity within the project area. The Chamber noted that the Offshore EIA Report should assess the potential risks posed to vessels during both the construction and O&M phases, particularly those using nearby shipping lanes. The UKCoS noted that a cumulative impact assessment should be carried out. The UKCoS commented that the Offshore EIA Report should fully consider emergency response preparedness, including how emergency anchoring or vessel refuge procedures will be managed within the vicinity of the wind farm.	A detailed analysis of shipping traffic is provided in Section 6.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Potential impacts are considered for both the construction and O&M phase of the Project in Section 4.3 and Section 4.4, respectively, of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. The cumulative effect assessment has been undertaken for a 50 nm (92.6 km) buffer of the Proposed Development (Section 10 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). Embedded Mitigations, including an ERCoP, to be developed post-consent, are listed in Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
25/10/2024	Letter Response SFF (on behalf of the Anglo Scottish Fishermen's Association, Fife Fishermen's Association. Fishing Vessel Agents and Owners Association, Mallaig and North West Fishermen's Association, Orkney Fisheries Association, Scottish Pelagic Fishermen's Association, the SWFPA and Shetland Fishermen's Association).	SFF objected to use of floating foundation Wind Turbines as these can create 'no fish' zones. SFF noted that if floating Wind Turbines are necessary, their preferred Wind Turbine floating foundation option is Tension Leg Platform (with Vertical Tendon vs Tilted Tendon mooring systems), since they have lesser spatial footprint on the seabed and reduces the potential snagging hazard. SFF proposed that the siting of wet storage must be consulted with the fishing industry to ensure its impact on fishers is avoided at the outset SFF highlighted their opposition to using concrete mattresses and rock bags as cable protection in open water since they create severe snagging hazards for bottom trawl fishing vessels and static gears.	Floating and hybrid Wind Turbines have been ruled out following refinement of the PDE. Only fixed Wind Turbines are now considered, thus removing potential impacts related to floating Wind Turbines and wet storage. Volume 2, Chapter 3: Project Description outlines the parameters of the Proposed Development. Further information on commercial fisheries is discussed in the Commercial Fisheries chapter of the Offshore EIA Report (Volume 2, Chapter 13: Commercial Fisheries).

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
25/11/2024	Marine Directorate - Licensing Operations Team (MD-LOT) Scoping Opinion	MD-LOT emphasised compliance with MCA's MGN 654 guidance was required, including a minimum 28-day vessel traffic surveys. MD-LOT also requested a detailed NRA and consultation with stakeholders. MD-LOT reiterated points of note raised by other stakeholders such as the MCA, RYA Scotland, UKCoS and the NLB. MD-LOT emphasised that the cumulative effects of the Proposed Development in combination with other projects was assessed.	In alignment with the MD-LOT scoping opinion, a detailed NRA was undertaken (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) including over 28 days of recent vessel traffic surveys. Dedicated stakeholder consultation was undertaken including a HAZID workshop and feedback used in consideration of risks within Section 9 of the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) and impacts within this chapter (Section 14.10). Issues raised by other referenced stakeholders within MD-LOT's response have also been addressed as detailed in the consultation summary from their respective Scoping Opinion or Scoping Workshop responses (rows above this entry). The cumulative impact of the Proposed Development in combination with other project is detailed in Section 14.12. The consideration of risk of the cumulative scenario is detailed in Section 10 Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.
NRA Consultation			
14/01/2025	Consultation meeting MCA	The MCA highlighted that vessel traffic surveys undertaken would be older than 24 months at the time the application is submitted. Therefore, to meet MGN654 validity requirements, the project would be required to run a summer and winter top up survey.	Summer and winter top up surveys were completed throughout 2025 and are presented within the NRA (Volume 3, Technical Appendix 14.1 Shipping and Navigation Navigational Risk Assessment and Volume 3, Technical Appendix 14.3: Shipping and Navigation Vessel Traffic Survey Report 2025).

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
01/08/2025	Email RYA Scotland	No significant issues raised, providing that the normal mitigations are applied. Concern regarding buoys breaking loose or losing AtoNs, as experience has shown that this is not an unlikely scenario and that there can be a significant time lapse between this being noticed and repairs being made.	Embedded Mitigation is detailed in Section 14.9 and Section 9.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.
04/08/2025	Email MCA	No specific comments raised, other than what was included in their Scoping Opinion response.	See Scoping Opinion Response received on 16/09/2024.
05/08/2025	Email Kincardine OWF	Recommendation to contact their Fisheries Liaison Officer (FLO) given existing relationship. Note that communication and advanced notice of construction activity would be essential, and our concession area would need to be avoided. Note that liaison on emergency response will be necessary.	Embedded Mitigation measures that have been adopted include the inclusion of FLO, advanced Notice to Mariners (NtM) and development of an ERCoP. These are outlined in greater detail in Section 9.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
07/08/2025	Consultation meeting UKCoS and NLB Joint	UKCoS raised concerns about layout clarity, particularly regarding the exclusion of a triangular area on the western boundary and the visibility of lines of orientation. In addition the UKCoS noted that consistent shapes and clear grid orientation are important for surface navigation and safety. UKCoS also highlighted that while the likelihood of allision may be similar between Wind Turbines and Offshore Substation Platforms (OSPs), the consequence of an allision with an OSP is greater due to the potential for more serious damage. UKCoS asked whether cumulative modelling was being undertaken and recommended a wider cumulative assessment. UKCoS advised they would not be able to attend the HAZID date and requested to be updated following this.	Lines of orientation and layout are under review; feedback will be provided post-consent. OSP allision risk is acknowledged as having greater consequence and will be considered in hazard profiling. Cumulative impacts have been qualitatively assessed in Section 14.12. The Eastern Developers Group also coordinated efforts to assess cumulative impacts across their respective projects. The cumulative future case scenario was also discussed in the HAZID and stakeholders commented that modelling this was a borderer strategic matter better considered at a national level than through more limited coverage of individual projects. Therefore, the cumulative scenario has been considered only qualitatively for the area of Cumulative Effects Assessment (CEA) coverage (50 nm) within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. UKCoS chose to review the HAZID minutes and Hazard Log following the HAZID and minor corrections were made accordingly.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
	Consultation meeting UKCoS and NLB Joint	NLB emphasised the importance of consistent spacing of lighting and marking on the perimeter of the array, especially if spare Wind Turbine locations are used. NLB stressed the need for a Monitoring Programme for AtoNs to ensure timely response to failures. NLB reiterated the importance of preparedness for maritime incidents, including wreck management, environmental consequences, and emergency response planning. NLB recommended exercises and drills to ensure readiness. NLB emphasised the need for robust emergency response planning, particularly in the event of a vessel sinking within the array. They highlighted the importance of wreck management, pollution control, and timely information distribution. NLB recommended that policies and procedures be in place and that exercises and drills be conducted to ensure readiness for worst credible outcomes.	Consistent perimeter spacing and lighting/marking will be considered in layout refinement. AtoN status monitoring will be incorporated into the Outline AtoN Management Plan (Section 4.7 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). Details of emergency response, as well as points raised on maritime incident preparedness will be addressed in the ERCoP post-consent, including wreck management, pollution response, and stakeholder communication. Exercises and drills will be considered to ensure operational readiness (Section 9.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment).

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
	Consultation meeting UKCoS and NLB Joint	Both consultees raised concerns about the lack of cumulative assessment in the NRA, noting that recently consented wind farms may already be influencing vessel traffic patterns from the baseline data. UKCoS recommended that cumulative modelling be undertaken to assess wider impacts on shipping and navigation. NLB and UKCoS agreed that cumulative effects would significantly alter the risk landscape compared to the Proposed Development -in-isolation scenario. UKCoS expressed general comfort with the preliminary hazard and risk scoring but noted that Additional Mitigations may be required during the full HAZID phase. NLB reiterated the importance of asset protection and incident response during both O&M and maintenance phases. NLB raised concerns about the Eastern Greenlink (EGL) 2 subsea cable intersecting the Proposed Development site and the risk of simultaneous operations leading to allision or collision.	Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment focuses on the Proposed Development in isolation. However, effects of cumulative projects have been qualitatively considered in Section 10 of that technical report and Section 14.12 of this chapter. Cumulative impacts have been qualitatively assessed in Section 14.12. The Eastern Developers Group also coordinated efforts to assess cumulative impacts across their respective projects. The cumulative future case scenario was also discussed in the HAZID and stakeholders commented that modelling this was a borderer strategic matter better considered at a national level than through more limited coverage of individual projects. Therefore, the cumulative scenario has been considered only qualitatively for the area of CEA coverage (50 nm) within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Newly consented wind farms will be acknowledged in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment as part of the broader context. The HAZID and findings is detailed in Section 9.5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Additional Mitigations as explored during the full HAZID phase in Section 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Coordination with EGL2 is ongoing, and construction timelines are being actively discussed between developers. EGL2 is currently ahead of the Proposed Development in its programme and planned to be operational prior to construction of the Proposed Development.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
08/08/2025	Email MoD	No specific comments raised, other than what was included in their Scoping Opinion response, noting sections titled *"Military Practice and Exercise Areas and Danger Areas" and Unexploded Ordnance"* would be most relevant.	See Scoping Opinion Response received on 25/10/2025.
12/08/2025	Email Seagreen OWF	No perceived impact and no plans to submit a response.	Acknowledged.
HAZID Workshop			
19/08/2025	HAZID workshop SFF	SFF queried why the fishing industry was not consulted earlier on the Array Area layouts. They suggested that future consultations should be streamlined by involving all stakeholders at the same time. SFF also raised concerns about the impact of the wind farm on fishing activity, noting that some fishing methods may not be able to continue due to displacement and stock migration, particularly in light of climate change.	The layout design presented is indicative and subject to refinement post-consent. Early layout development was driven by SAR coordination requirements with MCA. Stakeholder input, including from the fishing industry, will be considered in final layout decisions. These will be refined and supported by the DSLP developed post-consent. Impacts on commercial fisheries, including displacement and changes to fishing methods, will be assessed in Volume 2, Chapter 13: Commercial Fisheries. Section 14.12 of this chapter has also considered cumulative effects and layout refinements based on ongoing surveys and stakeholder feedback.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
	HAZID workshop MCA	MCA noted that the layouts used in the NRA were not agreed or approved and asked whether the project intends to adopt design commitments at the post-consent stage, such as single- or double-line orientation. MCA also raised concerns about the cumulative impact of routing changes due to multiple OWFs in the area and asked whether these would be considered in future modelling.	Design commitments regarding layout orientation and spacing will be made in consultation with MCA during the post-consent phase, such as the DSLP (See Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). The layouts used in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment reflect the developer's preferred maximum and minimum options and are subject to change following geotechnical surveys and stakeholder input. Cumulative routing impacts have been addressed in Section 14.12 of this chapter through the CEA, which will qualitatively and quantitatively assess the combined impact of the Proposed Development and other nearby OWFs.
	HAZID workshop RYA Scotland	RYA Scotland asked whether the layouts used in the NRA represented the worst credible outcome, noting that layouts used for risk assessment may not resemble the final design. They also highlighted the importance of understanding what was scoped out of the basecase scenario to assess where vessel displacement may occur.	The layout considered in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment represents the worst credible outcome, including the maximum number of Wind Turbines for allision risk. This approach ensures conservative risk modelling. Displacement impacts and vessel routing changes have been considered in the CEA within Section 14.12 of this chapter. Stakeholder feedback on layout and vessel activity will inform post-consent planning and mitigation strategies including the DSLP (See Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment).

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
	HAZID workshop NLB	NLB recommended implementing a remote monitoring programme for AtoNs throughout the O&M phase to detect and respond to outages. They advised that Marine Coordination Centre technicians should be trained to manage AtoN outages, not just Wind Turbines. NLB also suggested internal audits of monitoring systems and raised concerns about wreck management, including emergency response planning for new or existing wrecks within the site. The NLB highlighted the need for timely response to buoyage breakout and clarified that responsibility lies with the asset owner.	AtoN status monitoring, technician training, and internal audits for AtoNs will be considered in post-consent plans, LMP and AtoN Management Plan and has been incorporated into the Embedded Mitigations (Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). Wreck management and emergency response planning are recognised as key components of the ERCoP, which forms part of the Embedded Mitigations (Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). Buoyage breakout is included as a hazard in the NRA presented in Section 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment, and mitigation responsibilities have been clarified. The design of buoyage systems will be fit for purpose, and timely notification and response protocols will be developed in coordination with NLB. These measures will be further detailed in post-consent documentation, such as LMP, and operational planning, such as the Navigational Safety and Vessel Management Plan (NSVMP).
	HAZID workshop RYA Scotland	RYA Scotland noted that guard vessels would presumably only be needed during the construction phase and not the O&M phase. In agreement with the hazard scoring for recreational vessel allision, stating that the frequency is very low	Guard vessels are primarily intended for the construction phase or during significant maintenance activities in the O&M phase. This approach is consistent with industry practice and stakeholder expectations. The low frequency of recreational vessel allision is acknowledged and reflected in the Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment scoring. These assumptions will be reviewed and updated as necessary during post-consent planning and operational risk assessments.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
	HAZID workshop MCA	MCA noted that Risk ID 10 had a property consequence score of 4 under the realistic most credible scenario and suggested that a large commercial vessel should have the same or higher scoring. MCA also highlighted increasing reports of allision with fishing vessels and recommended increasing the likelihood score for Risk ID 19.	Property consequence score for Risk ID 1 (Large Commercial in collision with Large Commercial) was increased from three to four under the realistic most credible scenario (see Section 9.5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). Frequency of occurrence for Risk ID 19 (Allision: Fishing and Recreational) was increased from three to four. These updates reflect stakeholder concerns and recent incident data. The revised scores are documented in the NRA and will inform future risk mitigation strategies and post-consent planning (see Section 9.5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment).
	HAZID workshop SWFPA	SWFPA agreed with increasing the allision likelihood score for fishing vessels, noting that for every incident reported, there is likely one that is not. They also expressed difficulty in visualising cumulative effects due to the mix of fixed and FOWFs, large OSPs, and limited space between other projects, especially under adverse conditions.	The frequency score for Risk ID 19 was updated to reflect stakeholder concerns. Cumulative impacts have been qualitatively assessed in Section 14.12. The Eastern Developers Group also coordinated efforts to assess cumulative impacts across their respective projects. The cumulative future case scenario was also discussed in the HAZID and stakeholders commented that modelling this was a borderer strategic matter better considered at a national level than through more limited coverage of individual projects. Therefore, the cumulative scenario has been considered only qualitatively for the area of CEA coverage (50 nm) within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
	HAZID workshop RYA Scotland	RYA Scotland suggested that instead of attempting a full cumulative assessment, the project could assess how sensitive the risk matrix is to changes, such as doubling vessel traffic, to determine whether risks remain tolerable (i.e. As Low as Reasonably Practicable (ALARP)).	Sensitivity analysis will be considered as part of future risk assessments and post-consent planning. This approach may provide a practical alternative to full cumulative modelling and help identify thresholds where risks exceed tolerability. Stakeholder suggestions have been used to inform the development of adaptive risk management strategies and scenario testing in this chapter.
27/08/2025	Individual consultation meeting Kincardine OWF	Kincardine OWF noted that fishing areas can be fished intensely, particularly by nomadic scallop trawlers operating in packs. Emphasising the need for cables to be buried to specification to avoid incidents. Kincardine OWF raised the issue of maintenance towage between Kincardine and the Netherlands, noting that the route passes near the Proposed Development. Kincardine OWF recommended that a specific towage route be identified and communicated between the two projects. Adding that towage is on an as needed basis. It was noted that towage is infrequent, with only one occurrence in the past year. Kincardine OWF supported the suggestion from NLB regarding remote monitoring capability for AtoNs to identify outages and respond promptly. It was recommended that the Proposed Development consider electronic monitoring.	Cable burial specifications are acknowledged and will be addressed in the project's design and construction planning (Section 4.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). Towage route coordination is recognised as a specific concern. and coordination planning will be continued post-consent through sharing of towage routes and notifications The LMP will be developed for the Proposed Development in coordination with NLB post-consent, including details on AtoN availability, remote monitoring, and procedures for responding to outages (Section 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment).

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
		Kincardine OWF agreed with the updated hazard scorings from the HAZID workshop. Also acknowledging concerns raised by RYA Scotland and fisheries representatives regarding buoy breakout hazards (IDs 38 and 39). Kincardine OWF raised concerns about cumulative impacts from multiple OWFs, noting displacement of fishing vessels and changing patterns already observed at Kincardine. Kincardine OWF referenced the Forth and Tay Commercial Fisheries Working Groups as actively considering cumulative impacts.	Impacts to Commercial Fisheries through displacement and changing patterns have been addressed in the EIA (Volume 2, Chapter 13: Commercial Fisheries). Hazard scoring updates have been incorporated into Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Buoy breakout risks are acknowledged and will be considered in mitigation planning and post-consent documentation, including ERCoP and NSVMP (Section 4.8 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). Cumulative impacts have been qualitatively assessed in Section 14.12. The Eastern Developers Group also coordinated efforts to assess cumulative impacts across their respective projects. The cumulative future case scenario was also discussed in the HAZID and stakeholders commented that modelling this was a borderer strategic matter better considered at a national level than through more limited coverage of individual projects. Therefore, the cumulative scenario has been considered only qualitatively for the area of CEA coverage (50 nm) within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

14.5 Data Sources

14.5.1 Information and data have been reviewed and analysed to inform the shipping and navigation baseline. In addition, consultation with relevant stakeholders has been undertaken to aid the collection of baseline information.

Desktop Study

14.5.2 Information within the Shipping and Navigation Study Area collected through a detailed desktop review of existing studies and datasets and used to inform the NRA is summarised in Table 14.4.

14.5.3 Both the literature review of the reports and numerical modelling using the datasets were used to characterise the baseline. Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment includes full details of the analysis undertaken to develop the shipping and navigation baseline.

Table 14.4: Summary of Key Data Sources

Title	Source	Extent	Year	Author
Admiralty Charts (1409-0, 02182B-0)	Triton Software Limited and UK Hydrographic Office (UKHO) (2025)	Entirety of Shipping and Navigation Study Area	2025	UKHO
High fidelity AIS data for May 2024 to April 2025	MadeSmart Group (2025)	Entirety of the Shipping and Navigation Study Area	2025	MadeSmart Group
Locations and details of Department for Transport (DfT) SAR Helicopter Taskings	DfT (2025)	Entirety of Shipping and Navigation Study Area	2025 dataset	DfT
OWF sites and Offshore Transmission Owners (OFTOs) in planning, construction and operational phases	Crown Estate Scotland (CES) (CES, 2025a)	Entirety of Shipping and Navigation Study Area	2025	CES
Tidal agreements in planning, construction and operational phases	CES (CES, 2025b)	Entirety of Shipping and Navigation Study Area	2025	CES
Disposal Sites in Scotland	Marine Scotland (Marine Scotland, 2024)	Entirety of Shipping and Navigation Study Area	2024	Marine Scotland
EMODnet 2024 vessel density grids	EMODnet (2024)	North Coast of Scotland	2024	EMODnet
Locations and details of maritime accidents reported to the Marine Accident Investigation Branch (MAIB).	MAIB (Obtained through freedom of information request) (MAIB, 2025)	Entirety of Shipping and Navigation Study Area	1992 to 2024	MAIB

Title	Source	Extent	Year	Author
Locations and details of maritime accidents reported to the Royal National Lifeboat Institution (RNLI).	RNLI Incident Data (RNLI, 2025)	Entirety of Shipping and Navigation Study Area	2008 to 2024	RNLI
Port Freight Annual Statistics 2024	DfT (2024a)	UK wide	2000 to 2024	DfT
UK Port Freight Traffic 2024 Forecasts	DfT (2024b)	UK wide	2024 to 2050	DfT
Oil and Gas fields, wells, pipeline infrastructure and surface infrastructure	North Sea Transition Authority (NSTA) (2025)	Entirety of Shipping and Navigation Study Area	2025	NSTA
UK harbour areas and military and exercises areas	Digitised from Admiralty Charts (UKHO, 2025)	Entirety of Shipping and Navigation Study Area	2025	UKHO
NP52 - Admiralty Sailing Directions: North Coast of Scotland Pilot	UKHO (Admiralty, 2022)	North Coast of Scotland	2022	UKHO Admiralty
Copernicus MetOcean Data	Copernicus Marine Data Store (2025)	Entirety of Shipping and Navigation Study Area	2025	Copernicus

Site-Specific Surveys

14.5.4 In total, four surveys have been undertaken for the Proposed Development. Two seasonally representative, 14-day site-specific surveys covering the Array Area plus 10 nm (18.52 km) were undertaken in July 2023 and January 2024, as agreed with the MCA, in line with standard industry practise, and in accordance with MGN 654. In addition, two additional surveys were undertaken in July and December 2025 to maintain survey data validity. The additional surveys were similarly undertaken to comply with MGN 654 guidance which states that for site-specific data to be valid for use, it must be no older than 24 months old at time of submission. It was agreed in consultation with the MCA that these additional surveys should be undertaken. A summary of the surveys is outlined in Table 14.5. Survey reports in Volume 3, Technical Appendix 14.2: Vessel Traffic Survey Report 2024, and Volume 3, Technical Appendix 14.3: Vessel Traffic Survey Report 2025.

Table 14.5: Summary of Site-Specific Survey Data

Title	Extent of Survey	Overview of Survey	Survey Contractor	Date
14-Day Summer Vessel Traffic Survey	Array Area + 10 nm	14-Day Vessel Traffic Survey to capture recreational and fishing vessel activity that do not broadcast AIS, by radar and visual observations.	Survey Vessel: Karelle	30/06/2023 to 14/07/2023
14-Day Winter Vessel Traffic Survey	Array Area + 10 nm	14-Day Vessel Traffic Survey to capture recreational and fishing vessel activity that do not broadcast AIS, by radar and visual observations.	Survey Vessel: Karelle	05/01/2024 to 19/01/2024
14-Day Summer Top Up Vessel Traffic Survey	Array Area + 10 nm	14-Day Vessel Traffic Survey to capture recreational and fishing vessel activity that do not broadcast AIS, by radar and visual observations.	Survey Vessel: Karelle	16/07/2025 to 30/07/2025
14-Day Winter Top Up Vessel Traffic Survey	Array Area + 10 nm	14-Day Vessel Traffic Survey to capture recreational and fishing vessel activity that do not broadcast AIS, by radar and visual observations.	Survey Vessel: Karelle	02/12/2025 to 16/12/2025

14.6 Baseline Environment

Overview of Baseline Environment

14.6.1 The following sections provide a summary of the shipping and navigation baseline environment. Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment includes full details of the analysis undertaken to develop the shipping and navigation baseline and information on current shipping patterns.

14.6.2 This section provides a summary of the key findings from the assessment of the baseline environment in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment and therefore both documents should be read in parallel. This section is intended to provide an overview of the baseline environment relevant to shipping and navigation and does not provide any additional information over that presented in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

Description of the Marine Environment

14.6.3 Key navigational features in proximity to the Proposed Development and relevant to the management of vessels and safety of navigation are described in this section. Further details on navigational features can be found in Section 5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. There are no IMO routeing/reporting measures or recommended channels in the Shipping and Navigation Study Area.

14.6.4 The closest commercial ports are Aberdeen, Montrose, and Peterhead. These are all located to the west of the Shipping and Navigation Study Area. Montrose is 5 nm (9.2 km) south-west, Aberdeen is 12 nm (22.2 km) west, and Peterhead is 19 nm (35.2 km) north-west. Stonehaven Harbour is used by recreational users and is located 3.9 nm (7.2 km) south-west of the Shipping and Navigation Study Area.

14.6.5 The closest operational offshore renewable project to the Shipping and Navigation Study Area is the Kincardine OWF located 0.8 nm (1.5 km) from the Study Area. Other nearby operational offshore renewable projects include Seagreen OWF (4.8 nm [8.9 km] south), Aberdeen OWF (11 nm [20.4 km] west) and Buchan Deep Demo (13.9 nm [25.7 km] north).

14.6.6 The Proposed Development is not within any UK Military Practice and Exercise Areas (PEXA). The nearest PEXA is D604, located approximately 11.9 nm (22 km) south-west of the Shipping and Navigation Study Area.

14.6.7 There are no existing subsea cables running through the Shipping and Navigation Study Area. However, the EGL2 subsea cable between Drax in North Yorkshire and Peterhead in Aberdeenshire is currently under construction and will pass through the Shipping and Navigation Study Area and the Array Area prior to the Proposed Development construction.

14.6.8 Charted within the east of the Array Area is a cluster of buoys associated with metocean monitoring, including a guard buoy, wave buoy, floating Light Detection and Ranging (LiDAR), and a subsurface mooring. As the campaign has now ended, these are no longer present.

14.6.9 There are no wrecks within the Array Area. Eight wrecks are located within the Offshore Export Cable Corridor as depicted on nautical charts, two of which are considered dangerous. No wreck is considered by the UKHO to have an impact on shipping and navigation.

14.6.10 There are no active aggregate extraction areas, dredge disposal sites, anchorages, or IMO traffic schemes within the Shipping and Navigation Study Area.

Vessel Traffic

Vessel Traffic Survey

14.6.11 Two MGN 654 compliant vessel traffic surveys were undertaken, one in summer 2023 and one in winter 2024. Due to the MGN 654 guidance on the acceptable validity period of the data being within 24 months of submission, it was agreed in consultation with the MCA that two further surveys during the summer and winter of 2025 would be undertaken to ensure recency of this seasonal data.

Vessel traffic surveys undertaken are summarised in Table 14.6. A more detailed analysis of the survey results is presented in Section 6.2 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

14.6.12 Recreational vessels were only recorded during the summer surveys (2023 and 2025). Fishing vessel activity (both transiting and fishing) was observed in all surveys with the greatest number in the summer 2025 survey with 13 transits observed within the Array Area during this survey. Relatively few recreational and fishing vessels were recorded by radar-only (i.e. did not have AIS fitted) equalling zero in the 2023 winter survey, nine in the 2023 summer survey, and four in the 2025 summer survey. As found in the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), the vessel traffic surveys identified similar vessel activity as shown in the AIS data and comparable across each of the survey campaigns showing little non-AIS vessel activity and limited seasonal variation. During the 2025 summer survey, a slight increase in recreational traffic occurred due to the Tall Ships race which included the Port of Aberdeen as a stop.

Table 14.6: Summary of Vessel Traffic Surveys

Attributes	Summer July 2023	Winter January 2024	Summer July 2025	Winter December 2025
Vessel	 Karelle (27.85 m Fishing Vessel)			
Dates	30/06/2023 (08:00) to 14/07/2023 (08:00)	05/01/2024 (12:30) to 19/01/2024 (12:30)	16/07/2025 (05:00) to 29/07/2025 (08:00)	02/12/2025 (17:00) to 16/12/2025 (17:00)
Downtime	No Downtime			
Survey Area	Proposed Development Array Area + 10 nm			
Total Transits Recorded (Survey Area)	328 (23.4/day)	241 (17.2/day)	380 (27.1/day)	137 (9.8/day)
Total Transits Recorded (Array Area)	71 (5.1/day)	53 (3.8/day)	91 (6.5/day)	40 (2.9/day)
Cargo	Survey Area: 71 (5.1/day)	Survey Area: 72 (5.1/day)	Survey Area: 80 (5.7/day)	Survey Area: 64 (4.6/day)

Attributes	Summer July 2023	Winter January 2024	Summer July 2025	Winter December 2025
	Array Area: 31 (2.2/day)	Array Area: 27 (1.9/day)	Array Area: 26 (1.9/day)	Array Area: 29 (2.1/day)
Cruise	Survey Area: 12 (0.9/day) Array Area: 3 (0.2/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)	Survey Area: 22 (1.6/day) Array Area: 1 (0.1/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)
Ferry	Survey Area: 0 (0/day) Array Area: 0 (0/day)	Survey Area: 1 (0.1/day) Array Area: 1 (0.1/day)	Survey Area: 2 (0.1/day) Array Area: 0 (0/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)
Fishing	Survey Area: 24 (1.7/day) Array Area: 11 (0.8/day)	Survey Area: 24 (1.7/day) Array Area: 3 (0.2/day)	Survey Area: 25 (1.8/day) Array Area: 13 (0.9/day)	Survey Area: 13 (0.9/day) Array Area: 5 (0.4/day)
Recreational	Survey Area: 6 (0.4/day) Array Area: 3 (0.2/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)	Survey Area: 81 (5.8/day) Array Area: 28 (2/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)
Tanker	Survey Area: 18 (1.3/day) Array Area: 6 (0.4/day)	Survey Area: 12 (0.9/day) Array Area: 8 (0.6/day)	Survey Area: 34 (2.4/day) Array Area: 7 (0.5/day)	Survey Area: 8 (0.6/day) Array Area: 1 (0.1/day)
Tug and Service	Survey Area: 197 (14.1/day) Array Area: 17 (1.2/day)	Survey Area: 132 (9.4/day) Array Area: 14 (1/day)	Survey Area: 136 (9.7/day) Array Area: 16 (1.1/day)	Survey Area: 52 (3.7/day) Array Area: 5 (0.4/day)

Future Baseline Scenario

14.6.13 The EIA Regulations require that "*a description of the relevant aspects of the current state of the environment (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 environmental information and scientific knowledge*" is included within the Offshore EIA Report.

14.6.14 If the Proposed Development does not come forward, an assessment of the 'without development' future baseline conditions has also been carried out and is described within this section.

Commercial Traffic

14.6.15 Analysis of the future case traffic profile has been undertaken within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Overall, national port traffic is forecast to remain relatively flat in the short term (within a decade), but grow slightly in the long term (ten years +), with total UK port traffic projected to be approximately 7.8% higher in 2050 compared to 2023 (DfT, 2024b). This long term growth is driven predominantly by increases in unitised and dry bulk freight, which compensate for decreases in liquid bulk traffic.

14.6.16 An overall gradual decline in annual freight since the early 2010's is evident in DfT data (DfT, 2024a) for several local ports in proximity to the Proposed Development and which can have an influence on local vessel traffic. The Port of Aberdeen saw a peak in annual freight tonnage in 2007 with five million tonnes and since then has shown a general decrease in annual freight tonnage to 3.7 million tonnes in 2024. Over the more recent two years however, between 2022 to 2024, the port has shown a gradual increase of freight tonnage (from 3.4 million tonnes in 2022 to 3.7 million tonnes in 2024). Annual port arrival numbers show a minor increase but relative stable since 2020 at 900 to 950 commercial vessel arrivals. The Port of Montrose was one of the busier minor ports; however, a general declining trend of annual freight tonnage has been observed – from a peak in 2003 of 800,000 tonnes to 450,000 tonnes in 2024. Peterhead has shown similar trends in recent years since a peak in 2015 of 1.5 million tonnes to 670,000 tonnes in 2024.

14.6.17 Considering local ports and the size differences, it is therefore assumed that commercial freight traffic may remain steady or see a slight increase (driven by Aberdeen) and in line with UK wide projections.

14.6.18 Despite the decline in some local commercial tonnage, the north–south route connecting vessels transiting between European Union (EU) ports and the Pentland Firth remains relevant.

Passenger Traffic

14.6.19 The majority of passenger vessel traffic through the Shipping and Navigation Study Area is generated by the cruise industry. Therefore, recent trends in cruise calls at the Port of Aberdeen can be considered to provide insight into potential future passenger traffic through the area. The data show a steady increase in cruise activity since 2022, rising to approximately 70 calls in 2025 during the April to October cruise season. The Port of Aberdeen anticipates more than 100 cruise calls of up to 300 m in length annually by 2027 (Port of Aberdeen, 2024), most of which will fall into the summer months of the cruise season.

14.6.20 Although ferries operated by NorthLink and Caledonian MacBrayne intersect the Shipping and Navigation Study Area, these transits occur outside their core operational routes and therefore contribute minimally to the local passenger traffic profile. Given this pattern, it is anticipated that ferry-related passenger activity within the Shipping and Navigation Study Area will remain limited, with cruise vessel movements continuing to form the dominant source of passenger vessel traffic.

14.6.21 Cruise vessels therefore account for the significant majority of passenger vessel activity within the Shipping and Navigation Study Area. Based on recent and projected increases in cruise calls at the Port of Aberdeen, future cruise activity is expected to continue rising over the assessment period.

Fishing

14.6.22 It is anticipated that fishing activity is unlikely to change over the next five years, with both UK and non-UK vessels continuing to be active in the region as per the Trade and Cooperation Agreement agreed to by the UK upon exit from the EU and applicable from January 2021. Nevertheless, as this transition period is confirmed until June 2026, in the event that there is a reduction in non-UK fishing activity due to restrictions, it is anticipated that this will be balanced by an increase in UK fleet capacity. In May 2025, the EU-UK deal permitted EU fishing in UK waters keeping the current status quo giving EU boats continued access to UK waters until 2038.

14.6.23 It is noted that fisheries patterns can change based on a range of factors, including market demand, stock abundance, prices, and sustainability. However, given that the main fishing activities occurring in proximity to the Shipping and Navigation Study Area are well-established, it is therefore envisaged that fishing activity levels will remain constant. More detail on expected future changes according to different fishing types can be found in Volume 2, Chapter 13: Commercial Fisheries

Recreational

14.6.24 The RYA Water Sports Participation Survey conducted in 2019 (RYA, 2019b) found that the proportion of adults participating in boating activities has fluctuated between 6% and 8% between 2002 and 2018. Between 2008 and 2018, the proportion participating in yacht cruising, motor boating, and power boating remained consistent at 0.8%, 1.1%, and 0.7% respectively. More recent data published in the 2021 Water Sports Participation Survey is heavily influenced by COVID-19, with considerable variation between 2020 and 2022 due to national/local lockdowns (RYA, 2022).

14.6.25 Therefore, it is unlikely that there will be an appreciable change in the number of recreational users due to macro trends.

14.6.26 Furthermore, the Proposed Development is located approximately 21 nm (38.9 km) offshore, so little recreational activity is expected.

Oil and Gas

14.6.27 Many oil and gas platforms within the North Sea are approaching the end of their operational life and will transition to the decommissioning phase. As individual projects cease production, associated O&M vessel activity is expected to decrease. However, a temporary increase in vessel traffic is anticipated in the short term to support decommissioning activities, localised between the assets being decommissioned and their respective decommissioning base ports.

14.6.28 Aberdeen's South Harbour serves as a major decommissioning facility and is strategically located near key North Sea fields to facilitate nearby decommissioning campaigns, particularly of subsea infrastructure. Consequently, tug and service vessel traffic approaching Aberdeen from the east is expected to increase during periods of active decommissioning.

Increases in Traffic Associated with the Project

14.6.29 The Proposed Development will require additional vessel movements during construction, and to perform maintenance and inspection activities, before eventual decommissioning (see Section 4.5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). The construction base for the Proposed Development has yet to be determined; however, it is anticipated that the additional number of vessel movements within the Array Area would be comparatively low relative to existing tug and service vessel traffic (principally oil and gas traffic), with up to 2,120 expected total return transits over the entire five year construction phase (covering the Array Area and Offshore Export Cable Corridor). Assuming peaks in traffic occur over the summer six-month period, this equates to an average of 71 transits per month, or approximately 2.4 per day.

14.6.30 The O&M base for the Proposed Development has yet to be determined; however, it is anticipated that the additional number of vessel movements within the Array Area would also be comparatively low relative to existing service vessel traffic, with up to 713 expected total return transits per year (Array Area and Export Cable Corridor), averaging 59 per month, or approximately 2 per day. In addition to these trips, a further 146 trip and 114 trips will take place across the Array Area and Offshore Export Cables respectively over the 30 year O&M period.

Decommissioning Activities

14.6.31 Decommissioning of oil and gas infrastructure in the wider North Sea is ongoing. This, coupled with redevelopments of adjacent fields, could result in sporadic increases in oil and gas vessel activity navigating the Shipping and Navigation Study Area during active decommissioning phases.

Data Limitations and Assumptions

14.6.32 AIS is not necessarily required on all recreational or fishing vessels, dependent on size. Therefore, AIS analysis alone would underestimate the extent of these activities. The vessel traffic surveys using visual and radar observations have been combined with secondary sources (such as (RYA, 2019b and RYA, 2022) and stakeholder consultation through RYA Scotland (Section 14.4) to complete the picture of small craft vessel movements.

14.6.33 The incident data is unlikely to capture all incidents, with underreporting of minor incidents likely. However, the combination of RNLI and MAIB has been used to collate the most complete dataset possible. Not all information, particularly position, is captured in every incident report, but there were no data deficiencies that presented concern. Unreported minor incidents are highly unlikely to affect the results of this assessment. Extensive research and consultation provide confidence that all incidents that may have an effect on the outcomes of this assessment have been included.

14.6.34 Relevant nautical publications, such as Admiralty Charts, are updated periodically and therefore the information shown may not reflect the real-time features within the region with total accuracy. Additionally, not all navigational features may be charted. Consultation with local operators, including NorthLink Ferries, RYA Scotland, SFF and SWFPA (Section 14.4), has been used to verify the baseline.

14.7 Key Parameters for Assessment

Maximum Design Scenario

14.7.1 The Maximum Design Scenario (MDS) identified in Table 14.7 are those parameters expected to have the potential to result in the greatest effect on an identified receptor or receptor group. Any other development scenario within the PDE, will result in the same, or less, level of environmental effect. The scenario has been selected from the details provided in Volume 1, Chapter 3: Project Description.

Table 14.7: MDS Considered for Each Potential Impact as Part of the Assessment of Likely Significant Environmental Effects on Shipping and Navigation

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
Deviation of commercial vessels	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW scenario. <u>Project vessels</u> • Construction vessels - Array Area: up to 25 vessels on site and up to 1,671 return trips per year; and • Construction vessels – Offshore Export Cables: up to 16 vessels on site and up to 449 return trips per year. <u>Structures</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary; • Up to 67 Wind Turbines; • Maximum Wind Turbines rotor diameter up to 236 m (15 MW); • Minimum spacing between Wind Turbines of 1,038 m; and • Up to 3 OSPs (fixed), considering location on the outer perimeter of the Array Area as the maximum design scenario. <u>Cables</u> • Up to 137 km fixed (static) Inter-Array Cables (IACs) to be laid on the seabed out of a total of 151 km IAC cables; • Maximum 9 IAC crossings; • Maximum of 3 Interconnector Cables, up to 36 km total length; • Maximum 3 interconnector cable crossings; • Up to 3 Offshore Export Cables, up to 70 km length per cable; • Maximum 6 Offshore Export Cable crossings; • Maximum cable protection height 2 m for all cables;	**Construction phase** <u>Project vessels</u> Maximum anticipated number of project vessels and movements. <u>Structures</u> Maximum number of structures within the Array Area. <u>Cables</u> Maximum length and extent of cables relevant to this impact. Maximum height of cable protection and maximum number of crossings. <u>Programme/durations</u> Longest duration of works.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				• Cable protection for up to 50% of the cable length for all cables (i.e. 68.5 km of IACs, 35 km of Offshore Export Cables and 18 km of Interconnector Cables); and • Maximum height for all cable crossings 2.5 m. <u>Programme/durations</u> • Construction phase to last up to 5 years. **O&M phase** <u>Project vessels</u> • O&M vessels – Array Area: up to 12 vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 588 return trips per year. In addition to this, a further number of vessels will undertake another 146 return trips spread over the 30-year O&M phase; and • O&M vessels – Offshore Export Cables: up to 8 vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 125 return trips per year. In addition to this, a further number of vessels will undertake another 114 return trips spread over the 30-year O&M phase. <u>Structures</u> • Infrastructure in place as listed in construction. <u>Cables</u> • Infrastructure in place as listed in construction. <u>Programme/durations</u> • O&M phase up to 30 years.	**O&M phase** <u>Project vessels</u> Maximum anticipated number of project vessels and movements. <u>Structures</u> Maximum number of structures within the Array Area. <u>Cables</u> Maximum length and extent of cables relevant to this impact. Maximum height of cable protection and maximum number of crossings. <u>Programme/durations</u> Longest duration of works.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				Decommissioning phase • A Decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed *in situ* with appropriate navigation markers will also be assessed.	**Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Increased collision risk	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW scenario. <u>Project vessels</u> • Construction vessels - Array Area: up to 25 vessels on site and up to 1,671 return trips per year; and • Construction vessels - Export Cable: up to 16 vessels on site and up to 449 return trips per year. <u>Structures</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary; • Up to 67 Wind Turbines; • Maximum Wind Turbines rotor diameter up to 236 m (15 MW); • Minimum spacing between Wind Turbines of 1,038 m; and • Up to 3 OSPs (fixed), considering location on the outer perimeter of the Array Area as the maximum design scenario.	**Construction phase** <u>Project vessels</u> Maximum anticipated number of project vessels and movements meaning there is a higher potential for collisions due to the increased traffic. <u>Structures</u> Maximum number of structures at the outermost extents of the Array Area potentially obscuring small vessels. <u>Programme/durations</u> Longest duration of works.

				Programme/durations • Construction phase to last up to 5 years. **O&M phase** Project vessels • O&M vessels – Array Area: up to 12 vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 588 return trips per year. In addition to this, a further number of vessels will undertake another 146 return trips spread over the 30-year O&M phase; and • O&M vessels – Offshore Export Cables: up to 8 vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 125 return trips per year. In addition to this, a further number of vessels will undertake another 114 return trips spread over the 30-year O&M phase. Structures • Infrastructure in place as listed in construction. Programme/durations • Operational lifetime up to 30 years. **Decommissioning phase** • A Decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed *in situ* with appropriate navigation markers will also be assessed.	**O&M phase** Project vessels Maximum anticipated number of project vessels and movements. Structures Maximum number of structures at the outermost extents of the Array Area potentially obscuring small vessels. Programme/durations Longest duration of works. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
Increased contact/allision risk	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW scenario <u>Structures</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary; • Up to 67 Wind Turbines; • Maximum Wind Turbine rotor diameter up to 236 m (15 MW); • Minimum spacing between Wind Turbines of 1,038 m; • Up to 3 OSPs (fixed) considering location on the outer perimeter of the Array Area as the maximum design scenario; and • OSP topsides up to 50 m length and 40 m width. <u>Programme/durations</u> • Construction phase to last up to 5 years. **O&M phase** <u>Structures</u> • Infrastructure in place as listed in construction. <u>Programme/durations</u> • Operational lifetime up to 30 years. **Decommissioning phase** • A Decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce	**Construction phase** <u>Structures</u> Maximum number of structures within the Array Area. <u>Programme/durations</u> Longest duration of works. **O&M phase** <u>Structures</u> Maximum number of structures within the Array Area. <u>Programme/durations</u> Longest duration of works. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed *in situ* with appropriate navigation markers will also be assessed.	
Increased grounding risk	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW scenario. Cables • Up to 137 km fixed (static) IACs to be laid on the seabed out of a total of 151 km IAC cables; • Maximum 9 IAC crossings; • Maximum of 3 Interconnector Cables, up to 36 km total length; • Maximum 3 interconnector cable crossings; • Up to 3 Offshore Export Cables, up to 70 km length per cable; • Maximum 6 Offshore Export Cable crossings; • Maximum cable protection height 2 m for all cables; • cable protection for up to 50% of the cable length for all cables (i.e. 68.5 km of IACs, 105 km of Offshore Export Cables and 18 km of Interconnector Cables); and • Maximum height for all cable crossings 2.5 m. Programme/durations • Construction phase to last up to five years. **O&M phase** Cables • Infrastructure in place as listed in construction. Programme/durations • Operational lifetime up to 30 years.	**Construction phase** Cables Maximum length and extent of cables relevant to this impact. Maximum height of cable protection and maximum number of crossings. Programme/durations Longest duration of works. **O&M phase** Cables Maximum length and extent of cables relevant to this impact. Maximum height of cable protection and maximum number of crossings. Programme/durations Longest duration of works.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				Decommissioning phase • A Decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed *in situ* with appropriate navigation markers will also be assessed.	**Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Potential impact to SAR capability	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW scenario. <u>Project vessels</u> • Construction vessels - Array Area: up to 25 vessels on site and up to 1,671 return trips per year; and • Construction vessels - Offshore Export Cables: up to 16 vessels on site and up to 449 return trips per year. <u>Structures</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary; • Up to 67 Wind Turbines; • Maximum Wind Turbine rotor diameter up to 236 m (15 MW); • Minimum spacing between Wind Turbines of 1,038 m; • Up to 3 OSPs (fixed) considering location on the outer perimeter of the Array Area as the maximum design scenario; and • OSP topsides up to 50 m length and 40 m width.	**Construction phase** <u>Project vessels</u> Maximum anticipated number of project vessels and movements. <u>Structures</u> Maximum number of structures within the Array Area and lowest minimum spacing. <u>Programme/durations</u> Longest duration of works.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				Programme/durations • Construction phase to last up to five years. **O&M phase** Project vessels • O&M vessels – Array Area: up to 12 vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 588 return trips per year. In addition to this, a further number of vessels will undertake another 146 return trips spread over the 30-year O&M phase; and • O&M vessels – Offshore Export Cables: up to eight vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 125 return trips per year. In addition to this, a further number of vessels will undertake another 114 return trips spread over the 30-year O&M phase. Structures • Infrastructure in place as listed in construction. Programme/durations • Operational lifetime up to 30 years. **Decommissioning phase** • A Decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures	**O&M phase** Project vessels Maximum anticipated number of project vessels and movements. Structures Maximum number of structures within the Array Area. Programme/durations Longest duration of works. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				above the seabed *in situ* with appropriate navigation markers will also be assessed.	
Interference with Radar, communications and positioning systems	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW scenario. <u>Structures</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary; • Up to 67 Wind Turbines; • Up to 3 OSPs (fixed) considering location on the outer perimeter of the Array Area as the maximum design scenario; and • OSP topsides up to 50 m length and 40 m width <u>Cables</u> • Up to 137 km fixed (static) IAC to be laid on the seabed out of a total of 151 km IAC cables; • Maximum of three Interconnector Cables, up to 36 km total length; and • Up to 3 offshore export cables, up to 70 km length per cable. <u>Programme/durations</u> • Construction phase to last up to five years. **O&M phase** <u>Structures</u> • Infrastructure in place as listed in construction. <u>Cables</u> • Infrastructure in place as listed in construction.	**Construction phase** <u>Structures</u> Maximum number of structures within the Array Area. <u>Cables</u> Maximum length and extent of cables relevant to this impact. <u>Programme/durations</u> Longest duration of works. **O&M phase** <u>Structures</u> Maximum number of structures within the Array Area. <u>Cables</u> Maximum length and extent of cables relevant to this impact. <u>Programme/durations</u> Longest duration of works.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				Programme/durations • Operational lifetime up to 30 years. **Decommissioning phase** • A Decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed *in situ* with appropriate navigation markers will also be assessed.	**Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Reduction in Under Keel Clearance (UKC) due to subsurface Offshore Infrastructure	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW Wind Turbine scenario. Cables • Up to 137 km fixed (static) IACs to be laid on the seabed out of a total of 151 km IAC cables; • Maximum 9 IAC crossings; • Maximum of 3 Interconnector Cables, up to 36 km total length; • Maximum 3 interconnector cable crossings; • Up to 3 Offshore Export Cables, up to 70 km length per cable; • Maximum 6 offshore export cable crossings; • Maximum cable protection height 2 m for all cables; • Cable protection for up to 50% of the cable length for all cables (i.e. 68.5 km of IACs, 105 km of Offshore Export Cables and 18 km of Interconnector Cables); and • Maximum height for all cable crossings 2.5 m.	**Construction phase** Cables Maximum length and extent of cables relevant to this impact. Programme/durations Longest duration of works.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				Programme/durations • Construction phase to last up to 5 years. **O&M phase** Cables • Infrastructure in place as listed in construction. Programme/durations • Operational lifetime up to 30 years. **Decommissioning phase** • A Decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed *in situ* with appropriate navigation markers will also be assessed.	**O&M phase** Cables Maximum length and extent of cables relevant to this impact. Programme/durations Longest duration of works. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Potential impact on ports/ harbours and other nearshore operations	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW scenario. Project vessels • Construction vessels - Array Area: up to 25 vessels on site and up to 1,671 return trips per year; and • Construction vessels - Offshore Export Cables: up to 16 vessels on site and up to 449 return trips per year.	**Construction phase** Project vessels Maximum anticipated number of project vessels and movements which will be using the base port once defined for construction.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				Structures • Maximum extent of Array Area infrastructure to remain within Array Area boundary; • Up to 67 Wind Turbines; • Maximum Wind Turbines rotor diameter up to 236 m (15 MW); • Minimum spacing between Wind Turbines of 1,038 m; and • Up to 3 OSPs (fixed), considering location on the outer perimeter of the Array Area as the maximum design scenario. Cables • Up to 137 km fixed (static) IACs to be laid on the seabed out of a total of 151 km IAC cables; • Maximum 9 IAC crossings; • Maximum of 3 Interconnector Cables, up to 36 km total length; • Maximum 3 interconnector cable crossings; • Up to 3 Offshore Export Cables, up to 70 km length per cable; • Maximum 6 Offshore Export Cable crossings; • Maximum cable protection height 2 m for all cables; • Cable protection for up to 50% of the cable length for all cables (i.e. 68.5 km of IACs, 105 km of Offshore Export Cables and 18 km of Interconnector Cables); and • Maximum height for all cable crossings 2.5 m. Programme/durations • Construction phase to last up to 5 years. **O&M phase** Project vessels • O&M vessels – Array Area: up to 12 vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 588 return trips per year. In addition to this, a	Structures Maximum number of structures within the Array Area. Cables Maximum length and extent of cables relevant to this impact. Maximum height of cable protection and maximum number of crossings. Programme/durations Longest duration of works. **O&M phase** Project vessels Maximum anticipated number of project vessels and movements.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				further number of vessels will undertake another 146 return trips spread over the 30-year O&M phase; and • O&M vessels – Offshore Export Cables: up to eight vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 125 return trips per year. In addition to this, a further number of vessels will undertake another 114 return trips spread over the 30-year O&M phase. <u>Structures</u> • Infrastructure in place as listed in construction. <u>Cables</u> • Infrastructure in place as listed in construction. <u>Programme/durations</u> • Operational lifetime up to 30 years. **Decommissioning phase** • A Decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed *in situ* with appropriate navigation markers will also be assessed.	<u>Structures</u> Maximum number of structures within the Array Area. <u>Cables</u> Maximum length and extent of cables relevant to this impact. Maximum height of cable protection and maximum number of crossings. <u>Programme/durations</u> Longest duration of works. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
Potential impact on small vessel activity (including fishing and recreation)	✓	✓	✓	**Construction phase** MDS taken to be the 67 x 15 MW scenario. <u>Project vessels</u> • Construction vessels - Array Area: up to 25 vessels on site and up to 1,671 return trips per year; and • Construction vessels - Offshore Export Cables: up to 16 vessels on site and up to 449 return trips per year. <u>Structures</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary; • Up to 67 Wind Turbines; • Maximum Wind Turbine rotor diameter up to 236 m (15 MW); • Minimum spacing between Wind Turbines of 1,038 m; • Up to 3 OSPs (fixed) considering location on the outer perimeter of the Array Area as the maximum design scenario; and • OSP topsides up to 50 m length and 40 m width <u>Cables</u> • Up to 137 km fixed (static) IAC to be laid on the seabed out of a total of 151 km IAC cables; • Maximum 9 IAC crossings; • Maximum of 3 Interconnector Cables, up to 36 km total length; • Maximum 3 interconnector cable crossings; • Up to 3 Offshore Export Cables, up to 70 km length per cable; • Maximum 6 offshore export cable crossings; • Maximum cable protection height 2 m for all cables; • Cable protection for up to 50% of the cable length for all cables (i.e. 68.5 km of IACs, 35 km of offshore export cables and 18 km of Interconnector Cables); and • Maximum height for all cable crossings 2.5 m.	**Construction phase** <u>Project vessels</u> Maximum anticipated number of project vessels and movements which could interact with fishing and recreational activity. <u>Structures</u> Maximum number of structures within the Array Area. <u>Cables</u> Maximum length and extent of cables relevant to this impact. <u>Programme/durations</u> Longest duration of works.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				Programme/durations • Construction phase to last up to 5 years. **O&M phase** Project vessels • O&M vessels – Array Area: up to 12 vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 588 return trips per year. In addition to this, a further number of vessels will undertake another 146 return trips spread over the 30-year O&M phase; and • O&M vessels – Offshore Export Cables: up to eight vessels at any one time will be involved over the duration of the O&M phase (up to 30 years) making a total of 125 return trips per year. In addition to this, a further number of vessels will undertake another 114 return trips spread over the 30-year O&M phase. Structures • Project infrastructure in place as listed in construction. Cables • Project infrastructure in place as listed in construction. Programme/durations • Operational lifetime up to 30 years. **Decommissioning phase** • A decommissioning Programme will be submitted to MD-LOT for consultation and approval; • The decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies; and	**O&M phase** Project vessels Maximum anticipated number of project vessels and movements which could interact with fishing and recreational activity. Structures Maximum number of structures within the Array Area. Cables Maximum length and extent of cables relevant to this impact. Programme/durations Longest duration of works. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O&M	D		
				• The approach for decommissioning is yet to be determined, however, for the purposes of this MDS, it is assumed that all electrical cables are anticipated to be left *in situ* to reduce environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed *in situ* with appropriate navigation markers will also be assessed.	

Impacts Scoped Out of the Assessment

14.7.2 The Scoping Workshop (see Table 14.3) was used to facilitate stakeholder engagement on topics to be scoped out of the assessment.

14.7.3 On the basis of the baseline environment and the Project Description outlined in Volume 1, Chapter 3: Project Description, no impacts were proposed to be scoped out at the Scoping stage.

14.7.4 The Proposed Development received a Scoping Opinion from Marine Directorate, which, alongside the understanding of MDSs and environmental baseline conditions, and further consultation with stakeholders, has informed the potential impacts that are to be scoped out from further assessment in EIA. Three of the potential impacts identified in the Offshore EIA Scoping Report have been scoped out of this Shipping and Navigation assessment. This is because floating and hybrid Wind Turbine designs have been ruled out following refinement of the PDE. Only fixed Wind Turbines are now considered, thus removing potential impacts specific to floating Wind Turbines and wet storage that had previously been identified.

Table 14.8: Impact Scoped Out of the Assessment for Shipping and Navigation

Potential Impact	Phase			Justification
	C	O&M	D	
Towage operations	✓	✓	✓	Floating and hybrid Wind Turbines have been ruled out following refinement of the PDE. Only fixed Wind Turbines are now considered, thus removing potential impacts related to floating Wind Turbines and wet storage.
Breakout or loss of station of a floating Wind Turbine	✓	✓	✓	
Impact of floating Wind Turbine mooring systems and interactions with vessels at risk of snagging	✓	✓	✓	

14.8 Methodology for Assessment of Effects

Overview

14.8.1 The shipping and navigation assessment of effects has followed the methodology set out in Volume 1, Chapter 4: Environmental Impact Assessment Methodology. In addition, guidance, policy and legislation relevant to Shipping and Navigation as detailed in Section 14.3 has been considered in the assessment of effects.

14.8.2 Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment has been referred to, where applicable, and where the NRA assessed impacts to be ALARP this has been used throughout to justify the impact assessment.

14.8.3 Following the HAZID workshop undertaken as part of the NRA, further mitigation measures were adopted as part of the Embedded Mitigation measures (shown in Section 14.9). Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment found that, after the application of the Embedded Mitigation, the Proposed Development does not pose an unacceptable risk to navigational safety. Therefore, it was determined that the 21 hazards scored as Medium Risk can be considered as ALARP and therefore the risk deemed Tolerable.

Criteria for Assessment

14.8.4 When determining the significance of effects, a process is used which involves defining the magnitude of the potential impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Environmental Impact Assessment Methodology.

14.8.5 The criteria for defining magnitude in this chapter are outlined in Table 14.9. Each assessment considered the spatial extent, duration, frequency and reversibility of impact when determining magnitude which are outlined within the magnitude section of each impact assessment (e.g. a duration of hours or days would be considered for most receptors to be of short term duration, which is likely to result in a low magnitude of impact).

Table 14.9: Definition of Terms relating to Magnitude of Impact

Magnitude of Impact	Definition
High	Frequent hazard occurrence, multiple times during the Proposed Development lifecycle (100% chance in a year).
	Non-hazard (commercial) impacts continuous throughout the Proposed Development duration (approximately daily).
Medium	Reasonably probable that hazard may occur once during the Proposed Development lifecycle (10%-100% chance in a year).
	Non-hazard (commercial) impacts would occur periodically under certain conditions throughout the Proposed Development duration (multiple times per year).
Low	Unlikely that hazard occurs during the Proposed Development lifecycle but has occurred at other OWFs (1%-10% chance in a year).
	Non-hazard (commercial) impacts would occur infrequently during uncommon conditions throughout the Proposed Development duration (approximately once per year).
Negligible	Extremely unlikely that hazard occurs at the Proposed Development and has rarely occurred within industry (less than 1% chance in a year).
	Non-hazard (commercial) impacts could occur during rare conditions throughout the Proposed Development duration (less than once per year).

14.8.6 The criteria for defining sensitivity in this chapter are outlined in Table 14.10.

Table 14.10: Definition of Terms Relating to the Sensitivity of the Receptor

Sensitivity of the Receptor	Definition
Very High	• Multiple loss of life; • Loss of vessel (in excess of £10 million); • Major pollution (Tier 3 as per national contingency plan (MCA, 2017)); or • Permanent interruption to operators/marine users.
High	• Single fatality/multiple serious injuries; • Serious damage to vessel (up to £10 million); • Serious pollution (Tier 2 as per MCA, 2017); or • Long term interruption to operators/marine users (~1 year).
Medium	• Serious injuries; • Damage to vessel (up to £1 million); • Moderate pollution (Tier 2 as per MCA, 2017); or • Short term interruption to operators/marine users (~1 month).
Low	• Multiple minor injuries; • Minor damage (up to £100k) to vessel; • Minor pollution (Tier 1 as per MCA, 2017); or • Temporary interruption to operators/marine users (~1 day).
Negligible	• Minor injury; • Minor damage (up to £10k); • Minor spill/no perceptible impact; or • Temporary interruption to operators/marine users (~1 hour).

14.8.7 The magnitude of the impact and the sensitivity of the receptor are combined when determining the significance of the effect upon shipping and navigation receptors. The particular method employed for this assessment is presented in Table 14.11 and Table 14.12.

14.8.8 Where a range is suggested for the significance of effect, for example, minor to moderate, it is possible that this may span the significance threshold. The technical specialist's professional judgement will be applied to determine which outcome defines the most credible effect, which takes in to account the sensitivity of the receptor and the magnitude of impact. Where professional judgement is applied to quantify final significance from a range, the assessment will set out the factors that result in the final assessment of significance. These factors may include the likelihood that an effect will occur, data certainty and relevant information about the wider environmental context.

14.8.9 The EIA Regulations require the identification and reporting of likely significant environmental effects. For the purposes of this assessment:

- a level of moderate or more will be considered a 'significant' effect in terms of the EIA Regulations; and
- a level of minor or less will be considered 'not significant' in terms of the EIA Regulations.

Table 14.11: Matrix Used for the Assessment of the Significance of the Effect

Sensitivity of Receptor	Magnitude of Impact			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Minor	Minor or Moderate	Moderate or Major	Major
Very High	Minor	Moderate or Major	Major	Major

Table 14.12: Definition of Significance

Impact	Justification
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation, or within the margin of forecasting error.
Minor	These beneficial or adverse effects are generally, but not exclusively, raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the Proposed Development.
Moderate	These beneficial or adverse effects have the potential to be important and may influence the decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
Major	These beneficial or adverse effects are very important and are likely to be material in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national, or regional importance. However, a major change in a site or feature of local importance may also enter this category.

14.8.10 Table 14.13 also shows the alignment between the EIA significance and the terminology used within the formal risk assessment methodology adopted in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment – such as the alignment of risk, risk tolerability, and the ALARP principle.

Table 14.13: Alignment of Significance with NRA Hazard Rating

NRA Risk	NRA Tolerability	NRA Description	EIA Significance
Negligible	Broadly acceptable	Generally regarded as not significant and adequately mitigated. Additional risk reduction should be implemented if reasonable, practicable and proportionate.	Negligible Effect is not significant
Low			Minor Effect is not significant
Medium	Tolerable if ALARP	Generally regarded as within a zone where the risk may be tolerable in consideration of the Proposed Development. Requirement to properly assess risks, regularly review and implement risk controls to maintain risks to within ALARP where possible.	Minor: If ALARP then not significant. OR Moderate: If not ALARP then significant.
High	Unacceptable	Generally regarded as significant and unacceptable for Proposed Development to proceed without further review.	Major Effect is significant
Extreme			Major Effect is significant

14.9 Embedded Mitigation

14.9.1 As part of the Proposed Development design process, a number of Embedded Mitigation measures have been proposed to reduce the potential for impacts on shipping and navigation (see Table 14.14). They are considered at every stage of the Proposed Development through design and best practice and, as there is a commitment to implementing these measures, these have been considered in the assessment presented in Section 14.10 (i.e. the determination of magnitude and therefore significance assumes implementation of these measures). These Embedded Mitigation are considered standard industry practice for this type of development.

Table 14.14: Embedded Mitigation Adopted as Part of the Proposed Development

ID*	Embedded Mitigation Adopted as Part of the Proposed Development	Justification
1	Development of, and adherence to, a Cable Specification and Installation Plan (CSIP) post-consent.	Decreases the risk of grounding or snagging of anchors and fishing gear.
2	Use of anti-corrosion protective coatings and Scour Protection where there is potential for scour to develop around the Offshore Infrastructure, and it is appropriate to do so.	Decreases the risk of grounding or snagging of gear. Decreases risk and impacts arising from unplanned maintenance or failure of Offshore Infrastructure, such as those arising from structural degradation, exposure of subsea components, and additional O&M vessel traffic.
4	Development of, and adherence to, a Cable Burial Risk Assessment (CBRA) and the Cable Burial Assessment (CBA). Implementation, management and monitoring of cable protection, via burial or external protection where adequate burial depth is not feasible, will be undertaken as informed by these assessments. Results of these assessments, and commitments to post-construction monitoring, will be provided in the Cable Plan (CaP).	Decreases the risk of grounding or snagging of gear.
5	Development of, and adherence to, an Environmental Management Plan (EMP), including a Marine Pollution Contingency Plan (MPCP) and a Biosecurity Plan with commitments to monitoring and actions to minimise Invasive Non-Native Species.	Decreases the risk of pollution as a result of an allision with Offshore Infrastructure and/or a collision involving a Project vessel.
7	Development of, and adherence to, a Construction Method Statement along with a Code of Construction Practice.	Decreases the risk of collision, grounding and allision during the construction phase.
8	All relevant Health and Safety Executive procedures will be followed.	Decreases the risk of collision.
9	Development of, and adherence to, a combined Navigational Safety and Vessel Management Plan (NSVMP), describing Project vessels' requirements, passages, monitoring and controls.	Decreases the risk of collision.
11	Appointment of a Company FLO (CFLO). The CFLO will support ongoing liaison and ensure clear communication between the Applicant and commercial fishers.	Reduction in all direct impacts of the Proposed Development related to commercial fishers.
12	Advance warning and accurate location details of planned operations, associated Safety Zones and advisory passing distances will be given via NtMs and Kingfisher Bulletins.	All direct impacts of the Proposed Development mitigated.

ID*	Embedded Mitigation Adopted as Part of the Proposed Development	Justification
13	Development of, and adherence to, a LMP. The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting.	Decreases the risk of allision/contact with Offshore Infrastructure. The LMP will include AtoN status monitoring, AtoN internal audit technical training for evidence of AtoN status monitoring.
16	Application for, and use of, Safety Zones of up to 500 m during construction, major maintenance, and decommissioning phases. Advisory safe passing distances of up to 500 m will also be applied for mobile installation vessels.	Decreases the risk of allision with Offshore Infrastructure or collision with construction vessels.
17	Any objects dropped on the seabed during works associated with the Proposed Development will be reported in line with MD-LOT procedures and objects will be recovered where they pose a hazard to other marine users and where recovery is possible.	Decreases the risk of allision/contact and collision. Risk of fishing gear snagging.
18	All vessels working on the Proposed Development will meet the required certification standards and carriage requirements, along with following international marine regulations.	Decreases the risk of allision with Offshore Infrastructure or collision with vessels.
20	Suitable AtoN lighting and marking of the Proposed Development including construction buoyage and the use of a Cable Marker Board shall be implemented complying with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA Recommendations G1162 (IALA, 2021), to be finalised and approved in consultation with the MCA and NLB through a LMP.	Decreases the risk of allision/contact with offshore infrastructure
21	Wind Turbine design to have a minimum lower blade tip height of 33.12 m above Lowest Astronomical Tide (LAT).	This exceeds the minimum 22 m above Mean High Water Springs (MHWS) as per MGN 654 (MCA, 2021) requirement and decreases the risk of allision/contact with offshore infrastructure.
22	Development of, and adherence to, an ERCoP in consultation with the MCA.	Decreases the risk of impact to SAR capabilities;
23	Development of, and adherence to, an Operation and Maintenance Programme (OMP) in conjunction with approved post-consent construction plans.	Decreases the risk of collision.
24	Development of, and adherence to, a DSLP. The development of the DSLP includes consultation with the relevant authorities for approval, including the MCA and NLB.	Decreases the risk of allision/contact with Offshore Infrastructure and ensuring access for SAR.

ID*	Embedded Mitigation Adopted as Part of the Proposed Development	Justification
34	Drafting and implementation of a decommissioning programme, prepared in accordance with requirements of the Energy Act 2004, which will set out the extent of infrastructure to be removed as well as the methods and processes which will be used.	All direct impacts of the Proposed Development decommissioning phase mitigated.
40	Creation of a Waste Management Plan (WMP), which will describe the processes for handling and managing any waste materials.	The WMP will set out procedures to ensure all waste processing and handling activities with the potential to affect the environment are appropriately managed.
41	The Proposed Development will be marked on admiralty charts including an appropriate chart note.	Reduction in all direct impacts of the Proposed Development.
42	Compliance of project vessels with international marine regulations as adopted by the Flag State, including COLREGS (IMO, 1972) and SOLAS (IMO, 1974).	Decreases the risk of allision with Offshore Infrastructure or collision with vessels.
43	Use of a trenchless technique (e.g. HDD or pipe jack tunnelling) as the Landfall installation option.	Decreases the risk of grounding or snagging of cables and cable protection near shore.
48	Where boulder removal is required during site preparation, the location of large boulders that are relocated and may pose a snagging risk for fishing gear, will be disclosed to the fishing industry within a timely manner and in an accessible format.	Decreases the risk of snagging.
49	Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances to mitigate any impact which poses 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.	Decreases the risk of collision and risk of allision/contact with Offshore Infrastructure.
50	MGN 654 Annex 4 (MCA, 2021a) requires that hydrographic surveys will fulfil the requirements of the IHO Order 1a standard, with the final data supplied as a digital full density data set, and survey report to the MCA Hydrography Manager and the UKHO.	Decreases the risk of grounding or snagging of cables/gear.

*see Volume 3, Technical Appendix 4.6: Schedule of Mitigation and Commitments

14.10 Assessment of Significance

14.10.1 Table 14.7 summarises the potential impacts arising from the construction, O&M and decommissioning phases of the Proposed Development, as well as the MDS against which each impact has been assessed. An assessment of the likely significance of the effects of the Proposed Development on the shipping and navigation receptors caused by each identified impact is given below.

14.10.2 Most credible and worst credible scenarios referred to within this section were all presented and reviewed within the hazard workshop. Therefore, all most credible and worst credible consequences have been agreed with stakeholders.

IMPACT 1 – DEVIATION OF COMMERCIAL VESSELS

14.10.3 Existing commercial vessel and passenger ferry traffic could be displaced during construction due to the presence of buoyed construction areas, active Safety Zones, construction vessels and partially completed or pre-commissioned structures. Detailed construction schedules and areas would be defined post-consent, but it is assumed that construction areas could extend 500 m beyond the Site Boundary due to the possible Safety Zone definition for Wind Turbines positioned on the maximum extent of the Array Area boundary. Displacement would be greatest when the Proposed Development is fully constructed (maximum footprint) which is assessed in the O&M impacts.

14.10.4 The obstruction and subsequent re-routeing presented by the Proposed Development during construction or once in operation has the potential to result in increased journey time and distances or reduce optionality for routing in adverse weather. Impacts on routeing may in turn lead to increased collision, grounding and allision into other fixed structures (see Impacts 2, 3 and 4).

Construction Phase

Magnitude of Impact

14.10.5 Further details on the assessment of routing are shown in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment which shows the key commercial vessel routes identified from the vessel traffic analysis undertaken as part of the NRA. There were six commercial vessel routes identified that would be deviated by the Array Area and may be displaced as a result of construction. Of the six route centrelines impacted, there were no high-density routes over (100 vessels per month) – these being principally the oil and gas service vessel passing to the north of the Array Area. One route intersects the Array Area operating north/south with UK coastal cargo vessel traffic and international voyages via the Pentland Firth with between 50 to 100 transits per month (approximately 12 to 25 per week, or 1.5 to 3.5 per day). It is anticipated that these vessels will reroute inshore of the Array Area. One route to/from Aberdeen from oil and gas service vessels with 50 to 100 vessels per month may experience minor to no displacement with only a small portion of the 90th percentile route coverage crossing the Array Area which would only cause slight constriction of these routes. The remaining four routes were all low volume traffic with less than ten vessels per month.

14.10.6 Adverse weather routeing options may be reduced as a result of the Proposed Development construction. However, analysis of the vessel transits recorded during named storms between May 2024 and April 2025 showed no appreciable differences in vessel routeing were identified.

14.10.7 Moreover, in order to manage displacement impacts throughout the construction phase, the requirement to ensure third party vessels are aware of construction activities and display information on charts is included in Embedded Mitigation (Table 14.14).

14.10.8 Overall, the magnitude/frequency of occurrence has been assessed as medium, with route deviations sufficient to cause an impact to any singular vessel or operator experienced on a greater than annual basis but less frequently that daily.

Sensitivity of the Receptor

14.10.9 Commercial vessel routes that may be displaced due to construction on transit are likely on long-distance transits, heading to/from international ports. The maximum deviation distance would add approximately 1.43 nm (2.6 km) which, on an overall coastal or international voyage distance of hundreds of nautical miles the difference is negligible and within weather and tidal tolerances. It is therefore possible that these vessels could make a small adjustment to their route at an earlier point in their transit in order to deviate around the construction areas, with minimal impact on the overall journey distance and time. There were no regular running ferry service impacts.

14.10.10 Similarly, minimal changes to adverse weather routeing would be required as a result of the Proposed Development, with very small increases in the overall journey distance and time. Furthermore, there is substantial sea room to deviate around the obstructions with the smallest gap between Kincardine OWF and the Array Area still over 10 nm (over 18.5 km).

14.10.11 There is considered to be adequate surrounding sea room to allow any minor deviations to typical and adverse weather routes to be undertaken safely with consideration of MGN 654 recommendations on corridor width between adjacent wind farms (MCA, 2021a). Analysis of deviations and additional transit times are detailed in Section 8.2 of the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment).

14.10.12 As a result, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.13 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Minor** adverse which is not significant in EIA terms, as opposed to negligible, given that typical route deviations may be experienced on greater than annual basis.

Additional Mitigation and Residual Effect

14.10.14 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.15 The full build out of the Array Area means that deviations may be required that are similar to during the latter stage of the construction phase. Therefore, the overall magnitude of impact is considered similar, as the number of affected transits will most likely be the same. Therefore, given the similar level of impact to typical and adverse weather routing, and the same Embedded Mitigation including ensuring third party vessels are aware of any maintenance activities in advance that may require Safety Zones, displaying the wind farm information on charts and the presence of AtoNs, the magnitude/frequency of occurrence has been assessed as medium in alignment with during construction.

Sensitivity of the Receptor

14.10.16 Commercial and service vessels are likely to reroute to avoid the Array Area and any maintenance vessel activity in much the same way as they would to avoid the partially constructed Proposed Development and construction vessel activity during the construction phase of the Proposed Development. Therefore, these vessels could make a small adjustment to their route at an earlier point in their transit in order to deviate around the construction areas. Similar to the construction phase, route deviations would add a minor additional distance compared to the overall voyage distance.

14.10.17 The available sea room is sufficient to allow any minor deviations to typical and adverse weather routes to be undertaken safely.

14.10.18 As a result, taking the deviations and duration of impact into account, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.19 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as low, the overall effect significance is considered to be **Minor** adverse, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.20 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

14.10.21 Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, the risk pathway for this impact is expected to be similar in nature to the equivalent construction phase impact on vessel routing.

Magnitude of Impact

14.10.22 As with during construction, typical route deviations are anticipated to be experienced more than once per year by the vessels present. As a result, the magnitude/frequency of occurrence has been assessed as medium. This is owed to the vessel traffic profile and activity being similar during decommissioning as during construction with lower oil and gas service vessel activity following decommissioning but potentially greater commercial trade.

Sensitivity of the Receptor

14.10.23 As with the construction phase, there is adequate surrounding sea room to allow any minor deviations to typical and adverse weather routes to be undertaken safely. As a result, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.24 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as Negligible or Minor. The significance of effect for this hazard is considered to be **Minor** adverse which is not significant in EIA terms, as opposed to negligible, given that typical route deviations may be experienced on greater than annual basis.

Additional Mitigation and Residual Effect

14.10.25 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 2 – INCREASED COLLISION RISK

14.10.26 The construction, O&M or decommissioning of an OWF in an otherwise navigable area can constrain shipping routes and result in pinch points or areas of high vessel traffic density, with the potential to increase the number of encounters or potential collision situations.

14.10.27 The addition of project vessels associated with all phases of the Proposed Development may also increase potential encounter and collision scenarios. These vessels may cross-cut established routes to access the Array Area. The maximum additional vessel movements during construction of the Array Area are up to 1,671 return vessel movements, with a maximum of 25 vessels on site at one time. The maximum additional vessel movements during construction of the Offshore Export Cables are up to 449 return vessel movements, with a maximum of 16 vessels on site at one time.

14.10.28 Blind spots may result from Wind Turbines or the presence of large construction vessels blocking or hindering the view of other navigating vessels which could increase the risk of collision by reducing the capability for early and effective collision avoidance. The presence of a new obstruction may also result in reduced space for a vessel to take action to avoid collision or reduce the options available to do so.

14.10.29 Modelling was undertaken to establish the likelihood of a vessel collision occurring. The methodology is outlined in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. It is noted that modelling assumes maximum build out of the Proposed Development. It is therefore expected that, during the construction phase, these return periods would be lower with collision risk considered less likely up to and following the point of full build out.

14.10.30 It is noted that all vessels are assumed to be navigating with the appropriate equipment, lighting arrangements and in compliance with the COLREGs. In particular, Rule 5 requires vessels to maintain a proper lookout, Rule 7 requires vessels to determine if a risk of collision exists, and both Rule 8 and Section II describes the action to be taken to avoid a collision.

Construction Phase

Magnitude of Impact

14.10.31 Modelling results are detailed in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment and indicate that the frequency of collision events is low around the Array Area, with the highest collision likelihoods being tug and service vessels. The modelled likelihood of a collision is greatest on routes with higher vessel traffic density. The modelling showed return period for total combined collision frequency of this future scenario at one in 412 years, an increase of 53.9% on the current baseline. The modelled likelihood of a collision was greatest on routes with higher vessel traffic density and observed to be highest in crossing situations.

14.10.32 Given the minimum spacing of 1,038 m between Wind Turbines and the types of vessel traffic passing adjacent to the Proposed Development, a significant increase in risk to visual navigation and collision avoidance is not anticipated. The risks of collision associated with project vessels emerging from the Array Area would be managed through the NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan) to be developed post-consent which would define aspects of vessel management during the construction phase to set out the measures required to mitigate marine traffic and transport-related effects resulting from the construction of the Proposed Development.

14.10.33 Recreational and other small craft collision risk is considered low due to the low levels of these vessel types in the Shipping and Navigation Study Area and particularly within the Array Area. Moreover, some of these vessels could still choose to transit through the Array Area if no Safety Zones are in place during construction restricting their ability to do so. This could present challenges identifying the vessels through radar and targets could be visually less distinct amongst the Wind Turbines. For small craft, (such as fishing boats or yachts) transiting at approximately 6 kts, from emergence from the Array Area, it would take ~ten minutes for it to meet a vessel travelling perpendicular to the Array Area, assuming that most prudent mariners will transit more than 1 nm (1.9 km) from the boundary of the OWF. This ten minute window where small craft would be visible after emerging from the Array Area would provide opportunity to avoid a collision. The vessel traffic surveys also identified very few recreational vessels in proximity to the Proposed Development due to the distance offshore and, therefore, the increase in risk of collision would be minimal.

14.10.34 Construction vessel movements may interact with existing traffic, for example, when crossing shipping routes, increasing encounter potential and therefore collision risk. Embedded Mitigation is in place (Table 14.14) to deconflict project vessel movements with other passing traffic. Coordinated passage plans for project vessels would also be developed to reduce the potential impact on other traffic.

14.10.35 This assessment considers all stages of the construction process, including its maximum footprint at full build out during the final stage of construction. Based on the analysis, although the modelled increase in total collision frequency is 53.9% larger compared to the base case, the total frequency with the Proposed Development *in situ,* or at its final stage of construction, is modelled as one collision event every 412 years, which is low considering the lifetime of the Project.

14.10.36 Overall, considering the collision risk modelling and the Embedded Mitigations, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.10.37 Several international studies have explored the consequences of vessel-to-vessel collisions. The European Maritime Safety Agency (015) collision risk model developed for their FSA based on historical incidents estimated that 33% of struck roll-on/roll-off passenger (RoPax) vessels would result in water ingress, of these, 14% would result in sinking (resulting in a joint probability of 4.6% for a struck RoPax to sink). The MSC 85-17-2 FSA gives probabilities of 16% of collisions resulting in a serious casualty. Of these serious casualties, 50% of struck vessels would flood, 22% of those flooded vessels would sink, and out of those that sink, there is an even chance of undergoing gradual sinking or rapid capsize. Therefore, the probability of either of the latter occurring is 0.8%. In summary there is a 0.8% chance of a collision resulting in the worst credible scenario of a rapid capsize.

14.10.38 None of the recorded navigational incidents across the UK sector associated with UK OWFs between 2004 and 2024 resulted in loss of life, and analysis of MAIB data suggests that, overall, approximately 1% of collisions would result in loss of life. As such, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.39 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance is considered to be **Minor** adverse which is not significant in EIA terms.

14.10.40 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), 20 hazards were assessed that scored the risk of collision across all three project phases: construction, O&M and decommissioning. The three top collision hazards were identified to have an overall risk score between 7.5 and 7.9 and involved large commercial vessels, tug and service vessels and small craft vessels. Although collision hazards present a high-risk to people and business, the likelihood of it occurring is considered very low given the available sea room around the Proposed

Development and the Embedded Mitigations such as the promulgation of information, and appropriate site marking and charting. The hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.41 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.42 As described in the construction phase, the risk modelling for collision incidents was undertaken using a full buildout of the Array Area, being representative of latter stages of construction and the O&M phase. Collision modelling results are detailed in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Similar to the construction phase, the modelling indicates that the frequency of future case collision events have a return period for total combined collision frequency of this future scenario at one in 412 years, an increase of 53.9% on the current baseline. The modelled likelihood of a collision was greatest on routes with higher vessel traffic density and observed to be highest in crossing situations.

14.10.43 Based on the analysis, although the modelled increase in total collision frequency is 53.9% larger compared to the base case, the total frequency with the Proposed Development *in situ* is modelled as one collision event every 412 years, which is very low considering the Project lifetime.

14.10.44 Overall, considering the collision risk modelling, and the increased familiarity with the Proposed Development during operation compared to during construction, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.10.45 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the severity of an incident would be the same for the O&M phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.46 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as medium, the overall effect significance could be assessed as negligible or minor. The overall effect significance is considered to be **Minor** adverse, which is not significant in EIA terms, as opposed to negligible, given the severity of a worst credible collision scenario.

14.10.47 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), 20 hazards were assessed that scored the risk of collision across all three project phases: construction, O&M and decommissioning. The three top collision hazards were identified to have an overall risk score between 7.5 and 7.9 and involved large commercial vessels,

tug and service vessels and small craft vessels. Although collision hazards present a high-risk to people and business, the likelihood of it occurring is considered very low given the available sea room around the Proposed Development and the Embedded Mitigations such as the promulgation of information, and appropriate site marking and charting. The hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.48 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.49 Collision risk modelling which is detailed within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) alongside the Embedded Mitigations were considered. Although specific modelling was not undertaken for decommissioning, it is anticipated that the frequency is comparable to the construction phase. Therefore, the magnitude/frequency of occurrence has been assessed as low.

Sensitivity of the Receptor

14.10.50 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor would be the same for the decommissioning phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium. The potential consequence of vessel collisions is considered the same as for during construction and, therefore, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.51 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance is considered to be **Minor** adverse, which is not significant in EIA terms.

14.10.52 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), 20 hazards were assessed that scored the risk of collision across all three project phases: construction, O&M and decommissioning. The three top collision hazards were identified to have an overall risk score between 7.5 and 7.9 and involved large commercial vessels, tug and service vessels and small craft vessels. Although collision hazards present a high-risk to people and business, the likelihood of it occurring is considered very low given the available sea room around the Proposed Development and the Embedded Mitigations such as the promulgation of information, and appropriate site marking and charting. The hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.53 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 3 – INCREASED CONTACT/ALLISION RISK

14.10.54 The development of any wind farm in otherwise navigable waters increases allision likelihood given the presence of structures that previously were not there. During construction, O&M and decommissioning, a vessel is most likely to contact a wind farm structure as a result of human error or mechanical failure, which could be exacerbated by other factors such as a failure of an AtoN or adverse weather conditions, for example. The presence of new infrastructure, or partially constructed infrastructure, in the construction phase, can increase the risk that a vessel may be involved in an allision with it. Potential allision events could also arise from buoyage/markings associated with the Proposed Development.

14.10.55 Impacts were modelled to establish the likelihood of an allision. The allision modelling and results is outlined in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. Allision impacts are considered to be greatest during the latter stages of the construction phase or O&M phase when full build out is achieved, and modelling was conducted on this basis. The full results of the modelling are therefore presented in the O&M phase assessment.

Construction Phase

Magnitude of Impact

14.10.56 Analysis of historic allision incidents at existing OWFs have primarily involved project vessels at low speed. Project vessels, although more likely to allide with a Wind Turbine due to their working in close proximity, are also more likely to have crew who are experienced in safely transiting OWF areas.

14.10.57 Allision modelling conducted for Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment shows that the highest modelled allision frequencies for the Array Area are for vessel types categorised as support/other, at one in 220 years. The total allision probability of all vessels combined was one in 180 years and is still considered a low likelihood given the Project lifetime. These results were modelled for full build out of the Array Area and the therefore the construction phase would have fewer structures, and hence a lower frequency of occurrence, during earlier years of the five year construction schedule.

14.10.58 Third party vessel deviations will cause an increase in traffic transiting to the east of the Proposed Development between the Array Area and Kincardine OWF. Kincardine is located over 10 nm (18.5 km) east of the Array Area and outside of the Shipping and Navigation Study Area and therefore was not included in risk modelling. Given the distance of over 10 nm (18.5 km) between the two OWFs and allowing for approximately 1.5 nm (2.8 km) gap between a vessel routeing and offshore structure, the available navigable space is over 7 nm (12.9 km) and is not considered to notably increase the allision risk.

14.10.59 Given the considerable distance of the Array Area from the shore, most recreational craft travel further nearshore, closer to Landfall and are unlikely to contact a Wind Turbine during construction, or associated temporary buoyage.

14.10.60 It is noted that, during the construction phase, vessels would be less familiar with a new obstruction. To mitigate this, communication of construction activities and progress would be required and is embedded in the mitigations.

14.10.61 Overall, the magnitude of impact is assessed as low, based on the modelling undertaken.

Sensitivity of the Receptor

14.10.62 Multiple factors (vessel speed, angle and vessel characteristics) influence the sensitivity of the receptor should an allision occur.

14.10.63 Where previous incidents have occurred at existing OWFs, they have primarily involved project vessels at low speed and occur due to equipment failure. The most credible outcome is, therefore, minor damage and/or minor injuries. However, it is feasible that a worst credible allision involving a larger vessel might result in Wind Turbine collapse, holing and eventual flooding of a vessel and potential loss of life, though this is considered unlikely given the Embedded Mitigation in place.

14.10.64 Various studies have sought to quantify sensitivity of the receptor (Biehl and Lehmann (2006), VINDPILOT (2008), Dai *et al.* (2013), Moulas *et al.* (2017) and Presencia and Shafiee (2017)). These studies indicate that:

- ship allisions, even at low speeds, can cause significant damage to Wind Turbines including deformation and buckling;
- some studies of in-field project construction vessels (up to 4,000 GT), with allisions at high speeds, did not result in Wind Turbine collapse;
- modelling of allisions with large commercial ships could result in holing of the vessels hull and cargo release; and
- larger vessels (30,000 Deadweight Tonnes) alliding with a Wind Turbine might typically result in the tower collapsing away from the vessel.

14.10.65 Some studies however suggested that large commercial ships could result in the tower collapsing towards the vessel, with the damage likely to penetrate the deck.

14.10.66 With the Embedded Mitigations including the LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan), the Array Area would be well marked and there is sufficient sea room to safely pass around the site. However, were one of these vessels to allide with a Wind Turbine, given the available sea room, a glancing blow with minor damage is considered the most credible outcome.

14.10.67 Overall, the sensitivity of receptor has been assessed as medium to reflect both the most credible scenario and the worst credible scenario.

Significance of the Effect

14.10.68 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance is considered to be **Minor** adverse, which is not significant in EIA terms.

14.10.69 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), six hazards were assessed that scored the risk of allision across all three project phases: construction, O&M and decommissioning. The three top risk allision hazards were identified to have an overall risk score between 6.4 and 7.7 and involved OWF service and construction vessels, recreational craft and fishing vessels. Whilst the most credible consequences are minor, allisions could occur more frequently while conducting manoeuvres around the Offshore Infrastructure. Given the Embedded Mitigations including appropriate site marking and charting, AtoNs and Wind Turbine spacing, to ensure the vessels can maintain a safe distance from the structures, the hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.70 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.71 Allision modelling conducted for Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment shows that the highest modelled allision frequencies for the Array Area are for support/other vessels, at one in 220 years. The total allision probability of one in 180 years is still considered a low likelihood given the Project lifetime (30 years).

14.10.72 There is potential for fishing vessels to continue transiting within the Array Area post-construction. As such, there is potential for a fishing vessel to be involved in an allision with surface infrastructure. However, in the event a fishing vessel does choose to transit through the Array Area, the spacing between Wind Turbines is considered to be sufficient for safe navigation of small craft, including fishing vessels and recreational vessels.

14.10.73 Moreover, during the O&M phase, regular transiting vessels would be more familiar with avoiding a new obstruction following the construction phase. Communication of maintenance activities and progress would be required and forms part of the Embedded Mitigations.

14.10.74 Impact to Kincardine OWF is expected to be similar to the construction phase, with no notable additional risk caused by deviation of traffic inshore of the Proposed Development due to the available navigable space.

14.10.75 Overall, while the full number of Wind Turbines increases the likelihood of allision compared to the construction phase, the longer duration will also increase the vessel masters' familiarity with the structures. Therefore, the magnitude of occurrence is assessed to be low.

Sensitivity of the Receptor

14.10.76 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the severity of an incident would be the same for the O&M phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium, reflecting both a most credible and worst credible scenario.

Significance of the Effect

14.10.77 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance is considered to be **Minor** adverse which is not significant in EIA terms.

14.10.78 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), six hazards were assessed that scored the risk of allision across all three project phases: construction O&M and decommissioning. The four 'Medium Risk' allision hazards were identified to have an overall risk score between 6.4 and 7.8 and involved OWF tug and service vessels, large and small project vessels, and recreational craft and fishing vessels. Whilst the most credible consequences are minor, allisions could occur more frequently while conducting manoeuvres around the OWF infrastructure. Given the Embedded Mitigations including appropriate site marking and charting, AtoNs and Wind Turbine spacing, to ensure the vessels can maintain a safe distance from the structures, the hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.79 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.80 The magnitude of impact is considered to be the same as for construction, and therefore has been assessed as low. This is owed to the vessel traffic profile and activity being similar for decommissioning as during construction.

Sensitivity of the Receptor

14.10.81 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the severity of an incident would be the same for the decommissioning phase as during both the construction and O&M phase. Therefore, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.82 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance is considered to be **Minor** adverse, which is not significant in EIA terms.

14.10.83 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), eight hazards were assessed that scored the risk of allision across all three project phases: construction O&M and decommissioning. The three 'Medium Risk' allision hazards were identified to have an overall risk score between 6.4 and 7.8 and involved OWF tug and service vessels, large project vessels, and recreational craft and fishing vessels. Whilst the most credible consequences are minor, allisions could occur more frequently while conducting manoeuvres around the OWF infrastructure. Given the Embedded Mitigations including appropriate site marking and charting, AtoNs and Wind Turbine spacing, to ensure the vessels can maintain a safe distance from the structures, the hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.84 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 4 – INCREASED GROUNDING RISK

14.10.85 Although cable burial mitigates the risk of snagging or grounding post-construction, and the CBRA ensures these risks are adequately addressed for the types of gear used along the Offshore Export Cable Corridor, in some areas, cable burial may not be practicable, and they must be protected by other means, such as standard rock berm/concrete mattresses. The installation of Offshore Export Cables closer to Landfall may lead to a potential increase in the risk of grounding by either causing vessels to deviate closer to shore, where water depths are shallower, or reducing the water depth and UKC of vessels such that larger draught vessels may be more likely to ground on a cable itself.

14.10.86 Given the depths of the water in and around the Array Area, any route deviations required around the Array Area will not increase the risk of grounding.

14.10.87 The MGN 654 requires that any protection should not reduce the depth of water (referenced to Chart Datum) by more than 5% without being able to suitably demonstrate to the MCA that any identified risks are satisfactorily mitigated.

Construction Phase

Magnitude of Impact

14.10.88 The maximum height of Offshore Export Cable protection within the MDS is 2 m and would therefore reduce the water depth by 5% in any regions where the depth of water is less than 40 m. The 50 m water depth contour is approximately 2.6 nm (4.8 km) from the coastline, therefore only this section of the Offshore Export Cables will be affected by the 5% water depth reduction. However, water depths on the Scottish coast deepen to 20 m within 1 nm (1.9 km) from the coast. Very few vessels navigate within the 20 m contour. Therefore, it is unlikely that cable protection would impact the risk to these vessels; however, a CBRA would be used to assess such impact once a detailed engineering study was undertaken to determine appropriate protection and mitigation.

14.10.89 Furthermore, as shown in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment, most deep draught commercial ships navigated over approximately 5 nm (9.3 km) offshore. Therefore, even though the maximum cable protection thickness is up to 2 m, the depths are sufficient in the areas where larger ships transit such that there would be no discernible impact on the UKC and therefore grounding of commercial ships.

14.10.90 It is possible that works associated with the Offshore Export Cables could displace vessels and cause them to navigate closer to the shore and increase the risk of them running aground. However, the Offshore Export Cables are proposed in an area largely free of navigation constraints and there is appropriate sea room for vessels to navigate around the construction vessels. Embedded Mitigation, including guard vessels, use of NtMs to promulgate information in advance of construction activities, and a CaP will be used to reduce the impacts to vessel navigation during cable installation near to Landfall, and reduce the risk of them transiting closer to shore and grounding on the seabed or the cable.

14.10.91 As a result, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.10.92 In the unlikely event of a grounding, the most credible outcome is minor injuries and minor adverse publicity. However, while unlikely, the worst credible consequence could involve loss of small craft, with a single fatality.

14.10.93 Should a vessel ground on the cable protection or on the seabed as a result of deviations required as a result of the Proposed Development, the ERCoP will include provision of appropriate towage services that are able to mitigate the consequence of the incident by ensuring the vessel could be towed away from the cable protection if required.

14.10.94 As a result, the sensitivity of the receptor has been assessed as low, on the basis that the most credible outcome is minor injuries and locations where small vessel grounding is possible would be near to the shoreline. Although the worst credible outcome involves the potential for a single fatality, this is considered extremely unlikely due to the nature of grounding incidents and historic incident analysis.

Significance of the Effect

14.10.95 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The overall effect significance is considered to be **Minor** adverse, which is not significant in EIA terms. A minor rather than negligible significance was assigned on the basis that, while the likelihood of grounding is low and effects would be short term and localised, there remains a small but credible risk of grounding associated with the works, warranting classification above negligible.

14.10.96 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), four hazards were assessed that scored the risk of grounding across all three project phases: construction O&M and decommissioning. All four hazards were considered 'Low Risk' and therefore no Additional Mitigation was required which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.97 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.98 During the O&M phase, once cable burial is complete, the Offshore Export Cable will not cause any vessels to divert closer to Landfall. It is possible that, in some areas where burial is not practicable and the cable is protected, some large draught vessels may divert course slightly to avoid shallower ground, or that during maintenance activities, some vessels may need to deviate around the maintenance vessel. In which case, there is considerable sea room and water depths either side of the Export Cable Corridor to enable these deviations without increasing the risk of grounding.

14.10.99 Furthermore, large project vessels will be working near Landfall much less frequently during the O&M phase compared to the construction phase, further minimising the likelihood of a grounding event.

14.10.100 Overall, Embedded Mitigation should reduce the risk of grounding by limiting the need for vessels to deviate around the Offshore Export Cables and maintenance vessels.

14.10.101 As a result, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.10.102 The consequences of a vessel grounding during the O&M phase is anticipated to be the same as during construction. As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.103 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Minor** adverse which is not significant in EIA terms, as opposed to negligible, given that the risk will not be substantially lower than during construction.

14.10.104 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), four hazards were assessed that scored the risk of grounding across all three project phases: construction O&M and decommissioning. All four hazards were considered 'Low Risk' and therefore no Additional Mitigations were required which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.105 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.106 The likeliness of a vessel grounding during the decommissioning phase is anticipated to be the same as during construction. As a result, the magnitude of the receptor has been assessed as low.

Sensitivity of the Receptor

14.10.107 The consequences of a vessel grounding during the decommissioning phase is anticipated to be the same as during construction. As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.108 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The overall effect significance is considered to be **Minor** adverse, which is not significant in EIA terms. A minor rather than negligible significance was assigned on the basis that, while the likelihood of grounding is low and effects would be short term and localised, there remains a small but credible risk of grounding associated with the works, warranting classification above negligible.

14.10.109 Within the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), four hazards were assessed that scored the risk of grounding across all three project phases: construction O&M and decommissioning. All four hazards were considered 'Low Risk' and therefore no Additional Mitigations were required which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.110 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 5 – POTENTIAL IMPACT TO SAR CAPABILITY

14.10.111 Traffic associated with each phase of the Proposed Development would lead to an increased number of vessels and personnel in the area, and as such there may be an increase in the number of incidents requiring emergency response or impacts to emergency response procedures.

14.10.112 In the unlikely event of an incident, SAR assets are required to access the site or surrounding area without risk to themselves. In particular, Wind Turbines can pose a hazard to SAR helicopters and, therefore, the design of the Proposed Development should be such to enable helicopter access safeguarding HM Coastguard (HMCG) obligations within the UK SAR Region. An ERCoP is required and embedded in the mitigations to facilitate information sharing regarding the OWF and SAR organisations.

Construction Phase

Magnitude of Impact

14.10.113 Existing incident rates are considered low in the Shipping and Navigation Study Area based on the data studied within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. The assessments of the impact of the Proposed Development on the likelihood of collision and allision for vessels during construction showed that these are considered unlikely. Therefore, it is not anticipated that the Proposed Development would notably increase the observed existing incident rates, and consequently the likelihood of requiring SAR in the Array Area is relatively low.

14.10.114 A meeting was held on 15 August 2024 with the MCA and NLB to discuss the Array Area layout and proposed layout options were developed following this consultation (it is noted that final array layout will be confirmed through consultation with MCA and NLB post-consent via the Layout Plan, as per the Embedded Mitigation in Table 14.14). Additionally, an ERCoP will be agreed with MCA to enable SAR helicopter operations to be undertaken safely within, and in the vicinity of, the Array Area. The current minimum spacing between the Wind Turbines will be 1,038 m with 236 m blade diameter leaving 566 m clear between blade tips, more than the MGN 654 requirements of 500 m. Therefore, helicopter access guidance is met.

14.10.115 Although specific layouts are subject to detailed studies at a later date than when the EIA is conducted, the development of the DSLP includes consultation with the relevant authorities for approval, including the MCA and NLB, in order to ensure that access of SAR assets is not compromised and confirm that principals contained in MGN 654 Annex 5 (MCA, 2021c) are followed.

14.10.116 Given the Embedded Mitigations that act to reduce the likelihood of incidents, and therefore the need for SAR, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.10.117 Several trials have been conducted by HMCG and MCA in SAR at OWFs (see MCA, 2005; 2019). They found that searching within an OWF is more complex than in open sea and there may be a delay for entry into an OWF whilst the crew familiarise themselves with the site and layouts. During poor visibility, the importance of linear SAR lanes of sufficient width was identified as of significant importance. When transiting through an OWF, all communications and navigation equipment was reported to be operating successfully with Wind Turbines identifiable through radar. Unfamiliarity with transiting and winching in vicinity of Wind Turbines results in slower speeds and delays, which increases fuel consumption and may make searches less effective. Concerns have also been raised regarding visual identification of casualties, as Wind Turbines block the view, particularly during rough weather.

14.10.118 However, it should be considered that the onsite presence of construction vessels would form additional resource to respond to any incidents in the area in liaison with the MCA, both in terms of incidents associated with the Proposed Development (i.e. self-help resources), but also incidents occurring to third party vessels outside of the Proposed Development site.

14.10.119 In addition, as required under MGN 654, an ERCoP would be produced and submitted to the MCA detailing how the Project vessels would cooperate and assist in the event of an incident. The principles of SAR access for OWFs are contained in MGN 654, Annex 5.

14.10.120 Should an incident occur in proximity to the Proposed Development, the Project vessels are likely to be nearby and therefore be the first response vessel, further minimising the impact on SAR requirement.

14.10.121 As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.122 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor**.** The significance of effect for this hazard is considered to be **Negligible** which is not significant in EIA terms, as opposed to minor, given that relevant guidance for SAR will be adhered to, and Embedded Mitigations including production of an ERCoP, as well as the design of the Array Area will reduce the impact as far as practicable.

Additional Mitigation and Residual Effect

14.10.123 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.124 Most of the factors that might influence SAR capability, such as the lines of orientation and Wind Turbine spacing remain the same as during construction, however, during the O&M phase there will be lower levels of project vessels within the Array Area.

14.10.125 Similarly, existing incident rates are still considered low in the Shipping and Navigation Study Area based on the data studied within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. An assessment of the impact of the Proposed Development on the likelihood of collision and allision for vessels during O&M showed these are considered unlikely. It is not therefore anticipated that the Proposed Development would notably increase the observed existing incident rates.

14.10.126 Given the Embedded Mitigations, including the production of a layout plan in consultation with MCA and NLB, and the ERCoP in addition to the low likelihood of incidents, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.10.127 The outcome of an impact on SAR capabilities is anticipated to be similar to that expected during the construction phase, with a potential adverse effect on casualty visibility, but also with project vessels forming an additional resource to respond to incidents.

14.10.128 As a result, the sensitivity of the receptor has been assessed as low, given the Embedded Mitigations and minimum spacing between Wind Turbines that will allow emergency manoeuvres to be undertaken if required.

Significance of the Effect

14.10.129 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Negligible** which is not significant in EIA terms, as opposed to minor, given that relevant guidance for SAR will be adhered to, and Embedded Mitigations including production of an ERCoP, as well as the design of the Array Area will reduce the impact as far as practicable.

Additional Mitigation and Residual Effect

14.10.130 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.131 Decommissioning would lead to an increased number of vessels and personnel in the Shipping and Navigation Study Area, and as such there may be an increase in the number of incidents requiring emergency response or impacts to emergency response procedures. As with construction, the Embedded Mitigations that act to reduce the likelihood of incidents, and therefore the need for SAR, and the low baseline incident rates, the magnitude of impact has been assessed as negligible, the same as during construction. This is owed to the vessel traffic profile and activity being similar during decommissioning as during construction.

Sensitivity of the Receptor

14.10.132 The outcome of an impact on SAR capabilities is anticipated to be similar to that expected during the construction phase, with a potential adverse effect on casualty visibility, but also with project vessels forming an additional resource to respond to incidents.

14.10.133 As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.134 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor**.** The significance of effect for this hazard is considered to be **Negligible** which is not significant in EIA terms, as opposed to minor, given that relevant guidance for SAR will be adhered to, and Embedded Mitigations including production of an ERCoP, as well as the design of the Array Area will reduce the impact as far as practicable.

Additional Mitigation and Residual Effect

14.10.135 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 6 – INTERFERENCE WITH RADAR, COMMUNICATIONS AND POSITIONING SYSTEMS

14.10.136 Wind farm sites may adversely impact equipment used for navigation, collision avoidance or communications. The sound generated by the Wind Turbines could additionally mask navigational sound signals from vessels or AtoNs.

14.10.137 It is noted that the Array Area sits outside of all port limits, Vessel Traffic Service (VTS) and pilotage areas and therefore whilst shore-based radar may have partial coverage of the Array Area, it would not be actively monitored. Therefore, the presence of the Wind Turbines would not compromise vessel traffic monitoring obligations.

14.10.138 Equipment that may be adversely impacted as a result of the Proposed Development is discussed below:

- Very High Frequency (VHF): essential for communication between vessels and the shore and could be blocked by the presence of Wind Turbines;
- AIS: enhances the identification between vessels for collision avoidance. AIS signal could be blocked or interfered with by the presence of Wind Turbines;
- Global Navigation Satellite System (GNSS) (such as Global Positioning Systems (GPS)): used for satellite positioning systems and navigation. Satellite reception could be impacted by the presence of Wind Turbines;
- marine radar: used for both collision avoidance and vessel navigation. Wind Turbines, like other structures, can result in spurious returns such as side lobes, echoes, reflections and blanketing;
- shore radar: Similar to marine radars, shore radars could be impacted by the Wind Turbines;
- magnetic compass: Compasses are used for vessel navigation. These are potentially impacted by electromagnetic interference from the Wind Turbines. The degree of this impact is also related to the depth of water, cable design and alignment with the earth's magnetic field; and
- noise: The sound generated by the Wind Turbines could mask navigational sound signals from vessels or AtoNs.

14.10.139 A significant body of work has been conducted to examine these impacts in detail within the wider industry, and reference is made to the following studies:

- MCA and QinetiQ (2004): Results of the electromagnetic investigations and assessments of marine radar, communications and positioning systems undertaken at the North Hoyle wind farm by QinetiQ and the MCA;
- British Wind Energy Association (BWEA) (2007): Investigation of Technical and Operational Effects on Marine Radar Close to Kentish Flats OWF;
- Ocean Studies Board's Division on Earth and Life Studies (2022). W Generator Impacts to Marine Vessel Radar;
- Poupart, G (2003). Wind farms impact on radar aviation interests - final report; and
- Matthews *et al.* (2007). Stealth Solutions to Solve the Radar-Wind Farm Interaction Problem.

Construction Phase

Magnitude of Impact

14.10.140 A lot of the communication equipment that could be adversely impacted by the presence of the Wind Turbines and cables (including AIS, radar, and GNSS) will be used by vessels frequently transiting in proximity to the Array Area. However, not all of these vessels will experience these effects given that vessels can use different technologies, and transit at different distances from the structures. As a result, the magnitude of impact has been assessed as medium, given that these impacts do have the potential to occur frequently.

Sensitivity of the Receptor

14.10.141 The 2004 QinetiQ study found no noticeable effect on AIS reception or VHF communications both ship-shore and ship-ship within or adjacent to OWFs. A trial aboard SAR helicopters (MCA, 2005) also determined no significant impact on VHF direction finding capabilities. Similarly, the QinetiQ study found no noticeable effect on GPS reception, even in very close proximity to Wind Turbines.

14.10.142 In addition, the potential impacts on marine radar were studied extensively in both the MCA and QinetiQ (2004) and BWEA (2007) studies. Both studies determined that the reduced capability to track small vessels within OWFs and the risk of losing acquired targets should be considered by mariners navigating adjacent to OWFs. It is common practice that some of these effects are able to be lessened by the vessel bridge team by careful adjustment of radar controls, such as Gain. Based on this, the MCA developed a shipping route template (MGN 654) that placed the extent of these effects at 1.5 nm (2.8 km), increasing as the vessels transit closer to the Wind Turbines. Intolerable impacts may be experienced up to 0.5 nm (0.9 km) from the OWF. Historical evidence suggests that most vessels pass more than 0.5 nm (0.9 km) from an OWF and therefore these effects are lessened. Adjacent to the Array Area, the density of traffic is relatively low and there are few other navigational hazards, enabling vessels to transit 1.5 nm (2.8 km) from the Array Area. Furthermore, it is likely that most

vessels this far offshore would have AIS fitted to mitigate some of these impacts. Due to the Array Area being around 13.7 nm (22 km) from the mainland, it is also well clear of any ports and harbours, and any VTS coverage. Therefore, no appreciable impact on marine or shore radar for managing navigational safety is anticipated.

14.10.143 Whilst Wind Turbines make an audible sound whilst rotating, the low density of shipping and distance to other navigational marks make this potential impact negligible. In addition, maritime regulations for the audibility of a ship's whistle are well in excess of the typical Wind Turbine sound emissions even at very close range, with the sound level from a wind farm at a distance of 350 m estimated to be 35 dB to 45 dB (United States Department of Energy, 2008) and a ship's whistle for a vessel of between 75 m and 200 m required to generate in the order of 138 dB and be audible at a range of 1.5 nm (2.8 km), as per Annex III of the 1972 COLREGS, so these should be heard above the background noise of the site. Given the findings of these studies, no appreciable effects on navigation safety are anticipated from any of these impacts. All these impacts are also restricted to the Array Area alone and are unlikely to be affected by the presence of the Offshore Export Cables.

14.10.144 Compasses used for vessel navigation are potentially impacted by electromagnetic interference from the Offshore Export Cables, as well as the Wind Turbines. The degree of this impact is related to the depth of water, cable design and alignment with the earth's magnetic field. Whilst this impact has not been directly observed in studies, it is possible that small vessel compasses could be impacted near to cable Landfall. However, it is considered likely that small craft would navigate visually near to Landfall and therefore the impact on navigation safety is reduced. Moreover, the CaP set out as an Embedded Mitigation will likely consider issues including electromagnetic interference minimisation if required, and as subject to approval by the Scottish Ministers. Therefore, no appreciable impact on navigation safety from electromagnetic interference is anticipated.

14.10.145 Overall, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.146 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Minor** adverse which is not significant in EIA terms, as opposed to negligible, based on the fact that the impact may occur frequently for passing vessels.

Additional Mitigation and Residual Effect

14.10.147 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.148 A lot of the communication equipment that could be adversely impacted by the presence of the Wind Turbines and cables (including AIS, radar, and GNSS) will be used by vessels frequently transiting in proximity to the Array Area. However, as during construction, not all of these vessels will experience these impacts given that vessels can use different technologies, and transit at different distances from the structures. As a result, the magnitude of impact has been assessed as medium.

Sensitivity of the Receptor

14.10.149 The consequence of the Proposed Development impacting on communications, radar and positioning systems is considered to be similar to that anticipated for the construction phase, with no appreciable impact on navigation safety expected from the Wind Turbines or the cables.

14.10.150 Overall, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.151 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Minor** adverse which is not significant in EIA terms, as opposed to negligible, based on the fact that the impact may occur frequently for passing vessels.

Additional Mitigation and Residual Effect

14.10.152 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.153 As with the construction phase, the impact of communication system disturbance will be minimal. Furthermore, the frequency of occurrence will reduce throughout decommissioning as the number of structures within the Array Area decreases. As a result, the magnitude of impact has been assessed as medium.

Sensitivity of the Receptor

14.10.154 The consequence of the Proposed Development impacting on communications, radar and positioning systems is considered to be similar to that anticipated for the construction phase, with no appreciable impact on navigation safety expected from the Wind Turbines or the cables. Overall, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.155 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Minor** adverse which is not significant in EIA terms, as opposed to negligible, based on the fact that the impact may occur frequently for passing vessels.

Additional Mitigation and Residual Effect

14.10.156 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 7 – REDUCTION IN UNDER KEEL CLEARANCE DUE TO SUBSURFACE OFFSHORE INFRASTRUCTURE

14.10.157 Although cable burial mitigates the risk of grounding post-construction, and the CBRA ensures these risks are adequately addressed for the types of gear used along the Offshore Export Cable Corridor, in some areas, cable burial may not be practicable, and the Offshore Export Cables must be protected by other means, such as standard rock berm or concrete mattresses. The installation of Offshore Export Cables closer to Landfall may lead to a reduction in UKC.

Construction Phase

Magnitude of Impact

14.10.158 The maximum height of Offshore Export Cable protection within the MDS is 2 m and would therefore reduce the water depth by 5% in any regions where the depth of waters is less than 40 m. However, deep draught vessels are extremely unlikely to transit this close to the shore. Moreover, there is sufficient sea room for vessels to transit further away from Landfall.

14.10.159 Therefore, the magnitude of impact is deemed to be low.

Sensitivity of the Receptor

14.10.160 In the event of a substantial reduction in UKC, and a vessel snags on subsurface infrastructure, the most credible outcome consists of minor injuries, minor vessel damage and minor adverse publicity.

14.10.161 The reasonable worst credible outcome is considered to involve a single fatality, loss of small craft and minor pollution, although this is considered very unlikely given the marking and charting of the site, the use of Safety Zones, the sea room available around the Offshore Export Cable Corridor, and the development of an ERCoP.

14.10.162 Overall, taking this into account, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.163 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor** adverse which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.164 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.165 During the O&M phase of the Proposed Development, the reduction of UKC due to subsurface infrastructure outside of the Array Area is anticipated to impact vessels with the same frequency as is anticipated during the construction phase, given the height of the cable protection and available sea room.

14.10.166 Fishing vessels are at a higher risk due to the gear which they may deploy in proximity to subsea infrastructure. It is noted however that Embedded Mitigation of marking and charting of subsea cables and NtMs will make fishermen aware of these risks, and it would be unlikely they would deploy gear where unsafe to do so.

14.10.167 Therefore the magnitude of impact is considered to be low.

Sensitivity of the Receptor

14.10.168 In the event of a substantial reduction in UKC, and a vessel snags on subsurface infrastructure, the most credible outcome consists of minor injuries, minor vessel damage and minor adverse publicity.

14.10.169 The reasonable worst credible outcome is considered to involve a single fatality, loss of small craft and minor pollution, although this is considered very unlikely given the marking and charting of the site, the use of Safety Zones, the sea room available, and the development of an ERCoP.

14.10.170 Overall, taking this into account, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.171 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor** adverse, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.172 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.173 During the decommissioning phase of the Proposed Development, the reduction of UKC due to subsurface infrastructure is anticipated to impact vessels (both transiting and fixed fishing gear vessels) with the same frequency as is anticipated during the construction phase, given the height of the cable protection and available sea room.

14.10.174 Therefore the magnitude of impact is deemed to be low.

Sensitivity of the Receptor

14.10.175 The outcome in the event of a substantial reduction in UKC, and a vessel snagging on subsea infrastructure, is also anticipated to be the same as during construction, this is owed to the vessel traffic profile an activity being the same during decommissioning as during construction.

14.10.176 The most credible outcome consisting of minor injuries and minor vessel damage, and the reasonable worst credible outcome involving a single fatality, although this is considered very unlikely given the marking and charting of the site, the use of Safety Zones, the sea room available, and the development of an ERCoP.

14.10.177 Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of the Effect

14.10.178 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor** adverse which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.179 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 8 – POTENTIAL IMPACT ON PORTS/HARBOURS AND OTHER NEARSHORE OPERATIONS

14.10.180 Access to local ports may be affected by the presence of the Proposed Development and the operations associated with it. This can occur due to construction taking place in the vicinity of the port or due to project vessel operations from a port during each phase affecting the vessel traffic management in the area. The base ports for the Proposed Development have not been determined so it is not possible to assess the effects on them. Therefore, this section considers the effects of construction vessels operating in the vicinity of ports in the Shipping and Navigation Study Area.

14.10.181 The nearest port to the Shipping and Navigation Study Area is the Port of Monrose, located 5 nm (9.26 km) to the south-west; Aberdeen lies around 12 nm (22.2 km) to the west and Peterhead the furthest at 19 nm (35.2 km) to the north-west. The Array Area itself s situated around 21.5 nm (39.8 km) from the closest port, Aberdeen. Given these distances, vessel traffic will be able to enter and leave all three ports without hindrance, and therefore only minimal direct impacts on port access for third-party vessels are anticipated. The Export Cable Corridor lies closest to the Port of Montrose, at roughly 8 nm (14.8 km) away. Any potential effects on access to Montrose are expected to be limited to the construction phase during installation of the Offshore Export Cable. These activities will involve a small, temporary footprint, resulting in only minor and short-term impacts on port access.

Construction Phase

Magnitude of Impact

14.10.182 The Array Area is located approximately 21.5 nm (39.8 km) from the Port of Aberdeen and 35 nm (64.8 km) from the Port of Montrose. Therefore there would be a negligible impact on ports and harbours from the Array Area. Given the depth of water and available sea room, it is not anticipated that the construction of the Offshore Export Cables will adversely affect the ability for vessels to access ports.

14.10.183 In addition, vessels associated with the construction of the Proposed Development are not anticipated to notably increase overall baseline traffic levels in the area, with a maximum of 25 construction vessels required on site at any one time for the Array Area and 16 for the Offshore Export Cables. Marine coordination and vessel procedures will be in place to manage project vessel movements and reduce disruption to third party vessels as per the proposed NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan). As such, no notable impact on port access is expected from the construction vessels, noting any interactions with third party vessels would be managed via COLREGS in addition to the marine coordination procedures.

14.10.184 Overall, because the Offshore Export Cable Corridor is located over 8 nm (14.8 km) from the Port of Montrose, and the construction will be a limited footprint for a relatively short period of time, there will be a limited impact on access to the ports.

14.10.185 Given the distance of the Proposed Development from the ports, the low anticipated occurrence of vessel loitering associated with ports, and the Embedded Mitigation that ensure management of project vessels, the magnitude of impact on access to the ports is assessed to be low.

Sensitivity of the Receptor

14.10.186 Given the traffic volumes serving the local ports, and the minimal amount of disruption that would likely be experienced in the event that access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.10.187 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Minor** adverse, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.10.188 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.189 Whilst there will be notably less vessels active on site during the O&M phase, the likelihood of there being an impact to local ports and harbours as a result of the Proposed Development is considered to be much the same as during construction. Therefore, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.10.190 Given the minimal amount of disruption that would likely be experienced in the event that port access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.10.191 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Minor** adverse, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.10.192 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.193 As with the construction phase, the magnitude of impact on access to the ports is assessed to be low. This is owed to the vessel traffic profile and activity being similar during decommissioning as during construction.

Sensitivity of the Receptor

14.10.194 As with the construction phase, given the minimal amount of disruption that would likely be experienced in the event that port access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.10.195 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The significance of effect for this hazard is considered to be **Minor** adverse, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.10.196 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 9 – POTENTIAL IMPACT ON SMALL VESSEL ACTIVITY (INCLUDING FISHING AND RECREATION)

14.10.197 Small craft activity throughout the Shipping and Navigation Study Area is presented within Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment. During the phases of the Proposed Development, recreational vessel users may be at risk of route displacement, grounding, or a collision or allision event, while commercial fisheries may also be at risk of gear snagging. This could be in response to Proposed Development vessel traffic, installation activities and/or the physical presence of partially constructed surface and subsurface infrastructure.

Construction Phase

Magnitude of Impact

14.10.198 During the construction phase, the presence of partially protected cables during installation may increase anchor and fishing gear snagging risk in these discrete areas. During construction, it is part of the Embedded Mitigation that Safety Zones would be established of an appropriate configuration and extent to mitigate for potential snagging hazards. Local sea users will also be made aware of the construction activities and any partially protected cables via NtMs or via the Kingfisher bulletin.

14.10.199 Moreover, as part of the NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan), guard vessels may be used where applicable to ensure adherence with Safety Zones or advisory passing distances to mitigate impacts which pose a gear snagging risk during construction.

14.10.200 Some fishing vessels, particularly those that fish in proximity to the Offshore Export Cable Corridor, may also experience temporary displacement from fishing grounds as a result of cable installation activity. However, this activity will be short term, and the available sea room is sufficient for deviations to alternative fishing grounds be undertaken safely.

14.10.201 During the construction phase, the presence of a partially constructed wind farm may increase the likelihood of an allision with a Wind Turbine. However, given the low density of recreational vessels as far offshore as the Array Area, and Embedded Mitigations including a NSVMP, this is unlikely.

14.10.202 Impacts to recreational vessels are considered more likely where there is a higher density of recreational activity, particularly near the Landfall. Impacts may be experienced temporarily during cable installation for vessels navigating close to shore. Nevertheless, there is sufficient sea room to enable vessel deviation, and Embedded Mitigation including the promulgation of information will ensure that recreational vessels are aware of any planned cable construction activity.

14.10.203 Overall, considering all the Embedded Mitigation, the available sea room, and the fact that construction is only temporary, the magnitude of impact on small craft is assessed as low.

Sensitivity of the Receptor

14.10.204 The Fisheries Mitigation, Monitoring and Communication Plan (FMMCP) has been produced which sets out the means of ongoing fisheries liaison, such as through the appointment of a FLO through construction to reduce effects on commercial fisheries activity, where feasibly practicable.

14.10.205 Were a fishing vessel to snag a cable, the most credible outcome is loss of gear and minor damage to the cable. A more severe worst credible outcome is the loss of the fishing vessel and potential fatalities; however, through the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), this scenario is considered unlikely with the application of the Embedded Mitigation, including Safety Zones, FLO (defined within the FMMCP), and the CaP.

14.10.206 A recent study by the National Federation of Fishermen's Organisations (NFFO) and SFF has highlighted that the potential loss of fishing grounds can result in an impact referred to as 'Spatial Squeeze' (NFFO, 2022). Such an impact may result in boats currently fishing within the footprints of the Array Area being offset into the adjacent routes, interacting with other passing traffic and increasing the risk of collision. As shown in Section 6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment, the density of traffic around the Array Area is relatively low and therefore the change in the risk of collision is not anticipated to be significant.

14.10.207 Most of the recreational vessels observed within the Shipping and Navigation Study Area were focused along the Aberdeenshire coastline. Therefore, construction activity within the Array Area is not considered likely to have a significant impact on recreational vessel users. If recreational vessels did want to transit through the Array Area on passage to other ports, there is still sufficient sea room around the Safety Zone to enable deviation given the minimum Wind Turbine spacing of 1,038 m, so little impact is expected.

14.10.208 With regard to Offshore Export Cable installation near Landfall, were a recreational vessel to run aground on the cable route, the most credible outcome is minor injuries and minor damage to the cable. A more severe outcome is the loss of the small vessel and a single fatality; however, through the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) this is considered unlikely with the Embedded Mitigations (information promulgation, NSVMP and an ERCoP in place).

14.10.209 Considering the Embedded Mitigation and the unlikely potential for fatalities, the overall sensitivity of small craft is assessed as being medium.

Significance of the Effect

14.10.210 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor** adverse, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.211 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.212 Similar to the construction phase, the presence of cables may increase anchor and fishing gear snagging risk. The presence of the Proposed Development may also increase the likelihood of an allision with a Wind Turbine or OSP. However, given the low density of recreational vessels as far offshore as the Array Area, the requirement for all cables to be charted, and the requirement for a NSVMP, this is unlikely. Local sea users (fishing and recreational) will also be made aware of any maintenance activities undertaken related to the Proposed Development via NtMs or via the Kingfisher bulletin.

14.10.213 Moreover, as part of the NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan), guard vessels may be used where applicable to ensure adherence with advisory passing distances to mitigate impacts which pose a gear snagging risk during operation.

14.10.214 The impact to small craft is considered to be higher nearer the Landfall, as a result of any cable maintenance activities. This activity will be short term, and the available sea room is sufficient for necessary deviations to be undertaken safely. Risk controls would also be established (as set out in the Embedded Mitigation) to deconflict Proposed Development vessel movements with other passing traffic.

14.10.215 Overall, considering all the Embedded Mitigation and the fact that maintenance activities are only short term, the magnitude of impact on small craft is assessed as low.

Sensitivity of the Receptor

14.10.216 As the physical consequences of a vessel snagging or a recreational vessel runs aground are determined by the characteristics of the vessels involved, rather than by the project phase, the severity of an incident would be the same for the O&M phase as during both the construction phase.

14.10.217 Therefore, noting that the worst credible outcomes are considered very unlikely given the Embedded Mitigation in place, the sensitivity of the receptor is assessed as medium.

Significance of the Effect

14.10.218 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor** adverse, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.219 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.220 Similar to the construction phase, the presence of cables may increase anchor and fishing gear snagging risk. Overall, considering all the Embedded Mitigation and the fact that decommissioning is only short term, the magnitude of impact on small craft is assessed as low.

Sensitivity of the Receptor

14.10.221 As the physical consequences of a vessel snagging or a recreational vessel runs aground are determined by the characteristics of the vessels involved, rather than by the project phase, the severity of an incident would be the same for the decommissioning phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.222 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor** adverse, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.223 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

14.11 Inter-Related Effects

14.11.1 A description of the likely inter-related effects arising from the Proposed Development on shipping and navigation is provided in Volume 2, Chapter 23: Inter-Related Effects.

14.11.2 Inter-relationships are considered to be the impacts and associated effects of different aspects of Bowdun OWF on the same receptor. Inter-related effects are considered to be either:

- lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of Bowdun OWF (construction, O&M and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three project stages (e.g. underwater sound effects from piling, operational Wind Turbines, vessels and decommissioning); and
- receptor-led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on Infrastructure and Other Users, such as displacement of recreational activities and impacts to cables or pipelines or restrictions on access to these assets, may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects may be short-term, temporary or transient effects, or incorporate longer-term effects.

14.11.3 The impacts and effects identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. Table 14.15 lists the inter-related effects (project lifetime effects) that are predicted to arise during the construction, O&M, and decommissioning phases of the Proposed Development and also the inter-related effects (receptor-led effects) that are predicted to arise for shipping and navigation receptors.

14.11.4 Given the nature of shipping and navigation, project lifetime effects are uncommon because impacts occur at different times and do not typically build up across phases. No project lifetime effects with respect to shipping and navigation are predicted during construction, O&M, and decommissioning that are not already considered within the impact assessment undertaken within this chapter. None of the likely significant effects considered will be worsened through interactions across different phases of the Project.

14.11.5 As noted above, effects on shipping and navigation also have the potential to have other receptors and these effects are fully considered in the topic-specific chapters. These receptors and effects are:

- Commercial Fisheries (Volume 2, Chapter 13):
  - potential impact on small vessel activity.
- Socio-economics, Tourism and Recreation (Volume 2, Chapter 18):
  - potential impact on small vessel activity.
- Aviation and Radar (Volume 2, Chapter 15):
  - interference with Radar, communications, and positioning systems; and
  - potential impact to SAR capability.
- Infrastructure and Other Users (Volume 2, Chapter 16):
  - potential impact to SAR capability.

Table 14.15: Summary of Likely Significant Inter-Related Effects for Shipping and Navigation from Individual Effects Occurring Across the Construction, O&M and Decommissioning Phase of the Proposed Development (Project Lifetime Effects) and from Multiple Effects Interacting Across all Phases (Receptor-led Effects)

Description of Impact	Phase*			Likely Significant Inter-Related Effects
	C	O&M	D	
Project Lifetime Effects				
Deviation of commercial vessel and ferry routes	✓	✓	✓	The NRA conducted (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) was of sufficient detail that interactions between effects were considered from different phases. This identified that impacts are temporally distinct and do not produce increasingly higher impacts over multiple project phases. No impacts with respect to shipping and navigation are predicted to compound during construction, O&M, and decommissioning. None of the likely significant environmental effects considered will be worsened through interactions across different phases of the Project. Therefore, across the Project lifetime, the effects on shipping and navigation receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.
Increased collision risk	✓	✓	✓	
Increased contact/allision risk	✓	✓	✓	
Increased grounding risk	✓	✓	✓	
Impact on SAR capability	✓	✓	✓	
Interference with Radar, communications and positioning systems	✓	✓	✓	
Reduction in UKC due to subsurface Offshore Infrastructure	✓	✓	✓	
Impact on ports/harbour and nearshore operations	✓	✓	✓	
Impact on small vessel activity (fishing and recreational)	✓	✓	✓	
Receptor-led Effects				
Displacement of fishing activity and displacement of commercial vessels leading to fishing in higher density traffic areas	✓	✓	✓	Potential exists for interactions between impacts to shipping and navigation and commercial fishing in respect of displacement of fishing activity from the Proposed Development's Array Area. This displacement of fishing activity can be further displaced or disrupted in areas of dense commercial shipping caused by changes in commercial shipping routes. Alternatively, displacement of fishing away from the Array Area can lead to reduction in impacts of allision and snagging as less fishing would occur in these areas. These impacts are assessed in Volume 2, Chapter 14: Shipping and Navigation and within Volume 2, Chapter 13: Commercial Fisheries. The NRA conducted for shipping and navigation (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) was of sufficient detail that interactions between effects to marine receptors were considered, both from different phases and different receptors, and therefore the assessment captures these effects on marine receptors. Embedded Mitigation for the appointment of a FLO (defined within the FMMCP), advance notification (via NtMs and Kingfisher Bulletins), NSVMP resulted in the assessment of each on any single receptor to be captured. Commercial and recreational vessels may face temporary displacement, increased transit distances, or snagging/allision risks during construction, operation, and decommissioning. However, these risks are individually low and effectively minimised through Embedded Mitigation such as Safety Zones, cable burial/protection, charting/marking of infrastructure, promulgation of information, and coordinated vessel traffic management. Adequate sea room exists throughout the area, turbine spacing allows safe transit, and vessel densities (especially recreational offshore) are low. Because each potential impact is minor, well-controlled, and spatially/temporally constrained, they do not combine or interact in a way that would create significant inter-related effects. Therefore, with the presence of Embedded Mitigation, these receptor-led effects on shipping and navigation receptors are considered to be of no greater significance than those already assessed in isolation.
Displacement of fishing activity leading changes to contact/allision risk	✓	✓	✓	
Impact on small vessel activity (fishing/recreational) leading to changes in commercial fishing	✓	✓	✓	
Impact on vessel routing causing delays and cancelations for local operators in normal and adverse conditions	✓	✓	✓	Potential exists for interactions between impacts to shipping and navigation and socio-economics, tourism and recreation in respect of deviations leading to delays of sailing cancelations. The NRA conducted for shipping and navigation (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) identified that regular running ferry services would not be impacted by the presence of the Proposed Development in normal or adverse weather and therefore the inter-related effects of this impact is considered to be of no greater significance than that already assessed in isolation.

Description of Impact	Phase*			Likely Significant Inter-Related Effects
	C	O&M	D	
Impact to SAR capability from marine and aviation responders	✓	✓	✓	Potential exists for interactions between impacts to shipping and navigation and aviation and radar in respect of: • lighting and marking; • impact to radar, communications and positioning systems; and • SAR requirements. The need for SAR assets to enter the Proposed Development Array Area has impacts upon marine (lifeboat) and aviation (SAR helicopter) receptors. These impacts are assessed in Volume 2, Chapter 14: Shipping and Navigation and within Volume 2, Chapter 15: Aviation and Radar. The NRA conducted for shipping and navigation (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) was of sufficient detail that interactions between effects to marine receptors were considered, both from different phases and different receptors, and therefore the assessment captures these effects on marine receptors. Embedded Mitigation for LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan), NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan) and ERCoP to be developed in consultation with the relevant maritime and aviation authorities resulted in the assessment of each on any single receptor to be captured. All key navigational systems (VHF, AIS, GPS/GNSS, marine radar, shore radar, acoustic signals, and compasses) were assessed individually, and each was found to experience either no effect or only negligible, manageable effects from the presence of Wind Turbines and cables. Established evidence shows no appreciable interference with communications, positioning, or detection systems, and any minor radar or compass effects are either mitigable or occur only at very close range where vessels are unlikely to operate. Because each hazard results in only low-level, isolated impacts that do not compound or interact, there is no mechanism for inter-related effects to arise. Therefore, the receptor-led effects on shipping and navigation receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each receptor.
Interference with Radar, communications and positioning systems for marine and aviation receptors	✓	✓	✓	

* Proposed Development Phase refers to construction (C), O&M (O) and decommissioning (D).

14.12 Cumulative Effects Assessment

Methodology

14.12.1 The CEA assesses the impact associated with the Proposed Development together with other relevant projects and activities. Cumulative effects are defined as the effect of the Proposed Development in combination with the effects from a number of different projects, on the same receptor or resource. Further details on CEA methodology are provided in Volume 1, Chapter 6: Environmental Impact Assessment Methodology.

14.12.2 The projects selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise. Volume 3, Appendix 4.4: Cumulative Effects Assessment - Screening provides further information in relation to other projects and how this information is obtained and applied to the assessment. Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

14.12.3 In undertaking the CEA for the Proposed Development, it is important to bear in mind that other projects under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside the Proposed Development. Therefore, a tiered approach has been adopted. This provides a framework for placing relative weight upon the potential for each project to be included in the CEA to ultimately be realised, based upon the project's current stage of maturity and certainty in the projects' parameters. The tiered approach which will be utilised within the Proposed Development CEA employs the following tiers:

- Tier 1 – The onshore elements of the Project;
- Tier 2 – Projects that have an application submitted, are consented, or under construction;
- Tier 3 – Projects which have submitted a scoping report and/or have received a scoping opinion; and
- Tier 4 – Reasonably foreseeable projects including those with CES option or lease agreements.

14.12.4 The specific projects scoped into the CEA for shipping and navigation, are outlined in Table 14.16.

14.12.5 The tiering used here differs slightly to the tiering using in the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) in that the NRA excludes the onshore elements of the Project and separates projects that have been consented or are under construction from those with an application submitted and pending. That is, EIA Tier 1 = not included in NRA tiering; EIA Tier 2 = NRA Tier 1 + Tier 2. The difference in tiering used in the NRA had simply allowed for a more

stepped consideration of projects based on status. There is ultimately no change to the impact assessment presented below, as the Tier 2 cumulative impact assessment includes the same offshore renewable energy infrastructure projects as the NRA.

14.12.6 The range of potential cumulative impacts that are identified and included in Table 14.16 below, is a subset of those considered for the Proposed Development alone assessment. This is because some of the potential impacts identified and assessed for the Proposed Development alone, are localised and temporary in nature. It is considered therefore, that these potential impacts have limited or no potential to interact with similar changes associated with other plans or projects. These have therefore been scoped out of the CEA.

14.12.7 Similarly, some of the potential impacts considered within the Proposed Development alone assessment are specific to a particular phase of development (e.g. construction, O&M or decommissioning). Where the potential for cumulative effects with other projects only have potential to occur where there is spatial or temporal overlap with the Proposed Development during certain phases of development, impacts associated with a certain phase may be omitted from further consideration where no projects have been identified that have the potential for cumulative effects during this period.

14.12.8 Projects were included in the assessment based on a screening range covering both the spatial and temporal scope of the Proposed Development, defined by construction and decommissioning timelines and study area. The screening distance is set at 50 nm (92.6 km), based on industry best practice and was agreed with stakeholders present at the one-to-one consultations or the HAZID Workshop.

14.12.9 Figure 14.2 presents an illustrative representation of the cumulative developments that are located within the 50 m screening buffer zone or out with but within the vicinity. The location of these projects have all been considered. It is noted that OWF export cables are not all shown, as the routes are not yet known. However, all OWF export cables have been considered qualitatively within the assessment

14.12.10 Within the 50 m buffer zone Aberdeen, Hywind Scotland (Buchan Deep Demo), Kincardine, Methil Demo, Neart na Gaoithe (Array Area and OFTO), Seagreen 1 (Array Area and OFTO), Offshore Wind Farms, are already operational and therefore are considered part of the existing baseline. Forth Wind demonstration Project is screened out because the contract for difference was terminated and there was no known period for the construction and O & M therefore understood to have no temporal overlap potential.

14.12.11 Outwith the 50 m buffer Zone due to the proximity of Green Volt and Aspen to the buffer zone they have been conservatively screened in, all others due to the distance from Bowden Array Area and Cable Route have been screened out.

Table 14.16: List of Other Projects Considered Within the CEA for Shipping and Navigation

Project	Status	Distance from Proposed Development (km)	Description of Project	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Proposed Development
Tier 1						
Bowdun Onshore Infrastructure	Pre-Application	0.00	The Onshore Infrastructure associated with the Project.			
Tier 2						
Seagreen 1A Project	Consented	19.47	Seagreen 1A is made up of the 36 remaining Wind Turbines consented as part of the Seagreen 1 OWF. Seagreen 1A submitted a variation in consent to allow construction to take place between 2029 and 2032.	2029-2032	2033-2057	All phases of this project will overlap with the construction and O&M phases of the Proposed Development.
Inch Cape Offshore Wind Farm	Under construction	23.40	Inch Cape OWF is consented for up to 72 Wind Turbines with a capacity of 1,100 MW.	2025-2026	2027-2051	The O&M and decommissioning phases of this project will overlap with the construction and O&M phases of the Proposed Development.
Ossian Offshore Wind Farm	Application submitted but not yet determined	25.36	The Ossian Floating Wind project is proposed for up to 265 floating Wind Turbines with a capacity of 3,600 MW. Operational lifetime 35 years. Additional information submitted to MD-LOT October 2025.	2031-2038	2039-2073	The construction and O&M phases of this project will overlap the construction and O&M, and decommissioning phases of the Proposed Development.
Seagreen Phase 1A OFTO	Consented	28.05	Consent includes an export cable approximately 110 km in length to a landfall location at Cockenzie.	2029-2032	2033-Unknown	The construction and O&M phases of this project may overlap with the construction and O&M phases of the Proposed Development.
Inch Cape OFTO	Under construction	35.14	2 export cables with a capacity of 220 kV approximately 85 km in length between the landfall point at Cockenzie in East Lothian and the development area.	2025-2026	2027-Unknown	The and O&M phase of this project may overlap with the construction and O&M phases of the Proposed Development.
Berwick Bank OFTO (Cambois Connection)	Consented	46.53	Berwick Bank transmission is proposed for up to 4 cables with an O&M phase of 35 years.	2026-2029	2030-Unknown	The O&M phase of this project has the potential to overlap with the construction and O&M phases of the Proposed Development.
Berwick Bank Wind Farm	Consented	46.53	Berwick Bank OWF is proposed for up to 307 Wind Turbines with a capacity of up to 4,100 MW.	2027-2032	2033-2067	All phases of this project have the potential to overlap with all phases of the Proposed Development.

Project	Status	Distance from Proposed Development (km)	Description of Project	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Proposed Development
Muir Mhòr Offshore Wind Farm	Application submitted but not yet determined	52.50	Muir Mhòr OWF is proposed for up to 67 Wind Turbines at a capacity of 798 MW. Additional information submitted to MD-LOT October 2025.	2027-2030	2031-2055	The O&M and decommissioning phases of this project will overlap with the construction and O&M phases of the Proposed Development.
Salamander Offshore Wind Farm	Consented	58.68	Salamander OWF is proposed for up to 100 MW.	2027-2029	2030-2054	The O&M and decommissioning phases of this project will overlap with the construction and O&M phases of the Proposed Development.
Aspen Offshore Wind Farm	Application submitted but not yet determined	88.37	FOWF proposed for up to 1,000 MW and up to 72 Wind Turbines.	2027-2031	2032-2056	All phases of this project will overlap with the construction and O&M phases of the Proposed Development.
Green Volt OWF (Innovation and Targeted Oil and Gas (INTOG) Site 6 Flotation Energy)	Consented	92.16	Green Volt OWF is proposed for up to 35 Wind Turbines at a capacity of 560 MW. Construction phase anticipated to begin in 2025.	2027-2029	2030-2054	The O&M and decommissioning phases of this project will overlap the construction and O&M phases of the Proposed Development.
Tier 3						
Morven Hawthorn Pit Grid Connection Project	Pre-Application	1.81	Consists of the onshore and offshore infrastructure associated with the Morven North and South OWFs. Up to 6 export cables with a capacity of 525 kV.	2029-2032	2033-Unknown	The construction and O&M phases of this project may overlap with the construction and O&M phases of the Proposed Development.
EGL3	Pre-Application	6.28	2 GW system linking Aberdeenshire in Scotland and Lincolnshire in England. Approximately 575 km of subsea High Voltage Direct Current (HVDC) cable from Lincolnshire to a proposed Landfall at Sandford Bay, Peterhead.	2028-2030	2031-Unknown	The O&M phase of this project may overlap with the construction and O&M phase of the Proposed Development.
Morven North Offshore Wind Farm	Pre-Application	10.03	Morven North Offshore Wind Array Project is proposed for up to 96 wind turbines at a capacity of 1500 MW. Application of relevant consents and licences expected in 2026 with decision in 2027.	2030-2036	2037-2061	The construction, O&M and decommissioning phases of this project will overlap with the construction and O&M phases of the Proposed Development.

Project	Status	Distance from Proposed Development (km)	Description of Project	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Proposed Development
Morven South Offshore Wind Farm	Pre-Application	43.6	Morven South offshore Wind Array Project is proposed for up to 95 wind turbines at a capacity of 1500 MW. Application of relevant consents and licences expected in 2026 with decision in 2027.	2030-2036	2037-2061	The construction and O&M phases of this project will overlap with the construction and O&M phases of the Proposed Development.
Ossian Transmission Infrastructure	Pre-Application	25.28	Up to 6 export cables with a maximum total length of offshore cable route of 509 km. Anticipated application submission in the latter half of 2026. Operational lifetime 35 years.	2030-2033	2034-2068	All phases of this project will overlap with all phases of the Proposed Development.
Central North Sea Electrification (CNSE) Project	Pre-Application	36.00	Electrification of existing oil and gas infrastructure in the central North Sea. The infrastructure includes an onshore convertor station, an offshore convertor station, 66 kV offshore cabling connecting CNSE assets, 80 kV cabling to landfall, and 80 kV cabling from landfall to the onshore convertor station.	2027-2028	2029-unknown	The O&M phase of this project may overlap with the construction and O&M phases of the Proposed Development.
Bellrock Offshore Wind Farm	Pre-Application	62.23	Bellrock OWF is proposed for a capacity of 1,800 MW with between 42 and 80 Wind Turbines.	2027-2030	2031-2055	The O&M and decommissioning phases of this project will overlap with the construction and O&M phases of the Proposed Development.
EGL4	Pre-Application	73.68	2 GW system linking Lincolnshire in England and Fife in Scotland. Approximately 525 km of subsea HVDC cable from Lincolnshire to the Fife landfall either at Kinghorn or Largo Bay.	2027-2030	2031-Unknown	The O&M phase of this project may overlap with the construction and O&M phases of the Proposed Development.
Tier 4						
Flora Floating Wind Farm	Pre-Planning	46.83	INTOG site 4 is proposed for up to 50 MW.	Unknown	Unknown	There may be temporal overlap between all phases of this OWF project and those of the Proposed Development.

* Project Phase refers to construction (C), O&M (O) and decommissioning (D).

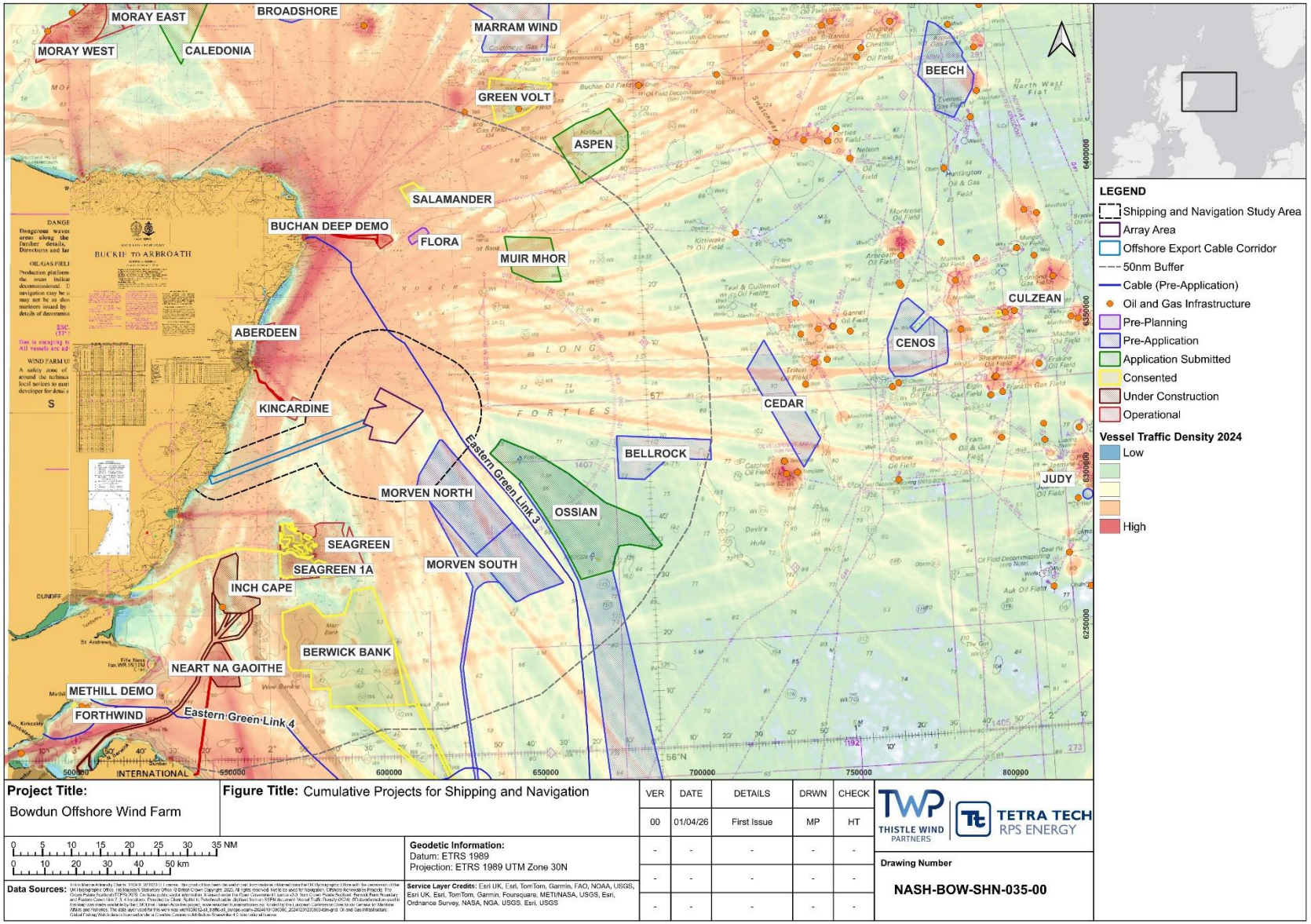

Figure 14.2: Cumulative Projects for Shipping and Navigation

Maximum Design Scenario

14.12.12 The MDS identified in Table 14.17 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the details provided in Volume 1, Chapter 3: Project Description as well as the information available on other projects to inform a 'MDS'. Any other development scenario within the PDE, will result in in the same, or less, level of environmental effect. All impacts have been considered with all cumulative projects by Tier. The table therefore shows the CEA MDS applied to all impacts.

Table 14.17: MDS Considered for Each Impact as part of the Assessment of Likely Significant Cumulative Effects on Shipping and Navigation

Potential Cumulative Effect	Phase*			Maximum Design Scenario	Justification
	C	O&M	D		
All Impacts	All Phases			The MDS is as described for the Proposed Development (Table 14.7) and assessed cumulatively with the following projects: **Tier 1:** Offshore Renewables: • Bowdun Onshore Transmission Infrastructure. **Tier 2:** Offshore Renewables: • Aspen OWF; • Berwick Bank Wind Farm; • Green Volt OWF (INTOG Site 6 Flotation Energy); • Inch Cape OWF; • Muir Mhòr OWF; • Ossian OWF; • Salamander OWF; and • Seagreen 1A Project. Subsea Cables • Inch Cape OFTO; • Seagreen Phase 1A OFTO; and • Berwick Bank OFTO **Tier 3** Offshore Renewables: • Bellrock OWF; • Morven North OWF; and	These projects involve activities which will result in potential impact to shipping and navigation which may contribute to the impact that the Proposed Development will also affect. **Tier 1:** The same maximum design parameters for the Proposed Development as detailed for the in isolation impact assessment are relevant for the shipping and navigation CEA in addition to the full build out of all Tier 1 projects listed. **Tier 2:** The same maximum design parameters for the Proposed Development as detailed for the in isolation impact assessment are relevant for the shipping and navigation CEA in addition to the full build out of all Tier 1 and 2 projects listed. **Tier 3:** The same maximum design parameters for the Proposed Development as detailed for the in isolation impact assessment are relevant for the shipping and navigation CEA in addition to the full build out of all Tier 1, 2 and 3 projects listed. **Tier 4:** The same maximum design parameters for the Proposed Development as detailed for the in isolation impact assessment are

Potential Cumulative Effect	Phase*			Maximum Design Scenario	Justification
	C	O&M	D		
				• Morven South OWF. Subsea Cables • Ossian Transmission Infrastructure; • Morven Hawthorn Pit Grid Connection Project; • CNSE Project; • EGL3; and • EGL4. **Tier 4**:** Offshore Renewables: • Flora Floating Wind Farm.	relevant for the shipping and navigation CEA in addition to the full build out of all Tier 1, 2, 3 and 4 projects listed.

* Phase refers to construction (C), O&M (O) and decommissioning (D).
** It is noted that the Tier 4 project is not anticipated to have any tangible additional impact on top of those presented by the Tier 3 projects, identified, therefore it can be considered as covered within the Tier 3 assessment.

Cumulative Effects Assessment

14.12.13 An assessment of the likely significance of the cumulative effects of the Proposed Development upon Shipping and Navigation receptors arising from each identified impact is given below.

IMPACT 1 – DEVIATION OF COMMERCIAL VESSELS

14.12.14 There are potential cumulative effects on shipping and navigation receptors as a result of the Proposed Development, when considered collectively with the large number of other existing and proposed OWFs (including ScotWind and INTOG projects). Existing projects that are operational are considered to be accounted for within the baseline assessment (given use of recent AIS data and surveys) and therefore are not discussed within this section.

14.12.15 Reference is made to route numbers as defined in Table 10.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment and a plot of cumulative scenario routeing is shown here for reference in Figure 14.3.

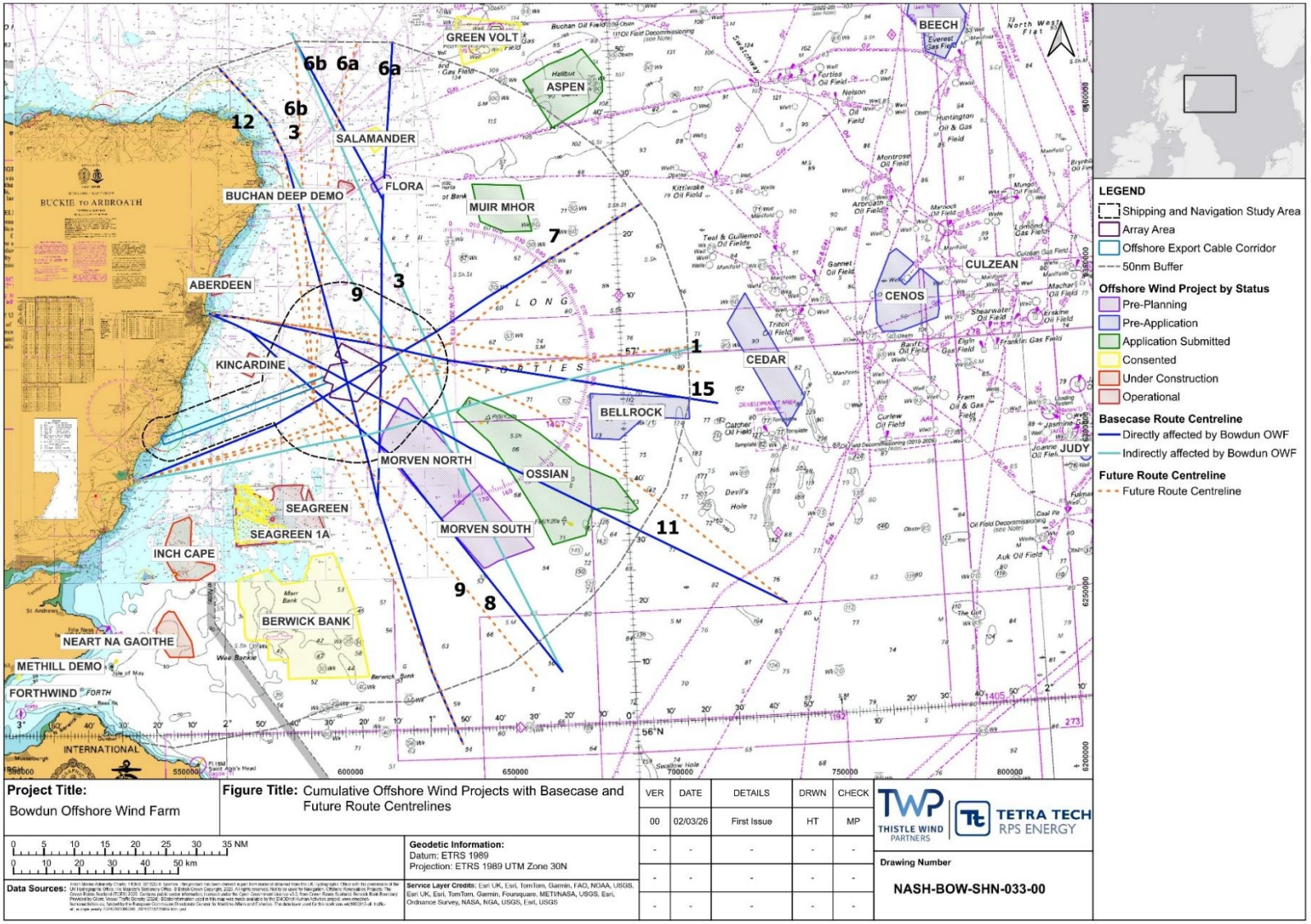

Figure 14.3: Cumulative Offshore Projects with Base Case and Assumed Future Route Centrelines (as shown in Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment)

Tier 1

14.12.16 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.17 Tier 2 projects introduce other OWFs, most notably Ossian OWF. The assessment of cumulative routeing as undertaken in the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) showed that a number of commercial routes could be displaced during construction on a cumulative basis in combination with the Tier 2 projects. All of these proposed developments are anticipated to be undergoing construction or be in operation for some duration during the Proposed Development construction.

14.12.18 The assessment of significance of the Proposed Development in isolation scenario (Section 14.10) identified six routes that would be affected directly by the Proposed Development. With the addition of Tier 2 projects, the impact on a further four routes would also have an indirect influence from the presence of the Proposed Development, that is, the Proposed Development would contribute to further deviations or constraints that would already be present from the presence of Tier 2 projects alone. These are Route 1 (primarily oil and gas service vessel operating out of Montrose), Route 3 (primarily coastal and international commercial vessel voyages), Route 6a (primarily cargo voyages) and Route 11 (primarily cargo and tanker voyages).

14.12.19 As a result, Route 1 would be required to deviate, most likely passing north of Ossian. Route 3 would likely deviate inshore of the Proposed Development, whilst Route 11 would be anticipated to deviate north of Ossian, before passing north of the Proposed Development into Aberdeen. These three routes are not heavily transited, with the busiest being Route 1, with approximately two to three vessels per week.

14.12.20 Routes impacted by the Proposed Development in isolation scenario would also be further affected by the addition of Tier 2 projects and therefore the impacts would still be evident on other routes as previously discussed in Section 14.10.

14.12.21 As a result, given the increase in number of regular operating oil and gas service vessels impacted by Tier 2 projects in combination with the Proposed Development, the magnitude of the impact is deemed to be high.

Sensitivity of Receptor

14.12.22 Despite potential impacts to routing in the cumulative scenario, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. An analysis of sea room and additional transit times are presented within Section 10 of the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). The requirement to ensure third party

vessels are aware of construction activities and display information on charts is also an Embedded Mitigation which will enable advance passage planning. Other relevant Embedded Mitigation include site marking and charting, and a LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) which would be agreed with the NLB post-consent.

14.12.23 Section 10 of the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) presented the anticipated future routeing scenario taking all proposed developments into account. It is noted that these include Tier 3 projects also. The largest deviation anticipated as a result of these projects is 4.58 nm (8.48 km) which, on an overall coastal or international voyage distance of hundreds of nautical miles the difference is negligible and within weather and tidal tolerances. It is therefore possible that these vessels could make a small adjustment to their route at an earlier point in their transit in order to deviate around the construction areas, with minimal impact on the overall journey distance and time. There were no regular running ferry services impacts.

14.12.24 It is also noted that this route is not directly impacted by the Proposed Development itself. It is noted that these deviations are likely to be less for the Tier 2 scenario.

14.12.25 Given the little impact that will be had on vessel routes, the sensitivity of the receptor is considered to be negligible.

Significance of Effect

14.12.26 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.27 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.28 It is noted that full build out of the Proposed Development during O&M will have a similar impact on routing as the near completed or pre-commissioned construction phase. Therefore, given the sea room available for deviations and the small additional distances, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.29 As a result, the magnitude of the impact is deemed to be high.

Sensitivity of Receptor

14.12.30 As with the construction scenario, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The requirement to ensure third party vessels are aware of O&M activities and display information on charts is also embedded in the mitigations which will enable advance passage planning. Other relevant Embedded Mitigation include site marking and charting, and a LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) which would be agreed with the NLB post-consent.

14.12.31 Therefore, the sensitivity of the receptor is considered to be negligible.

Significance of Effect

14.12.32 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.33 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.34 It is noted that that the impact on routeing will reduce as decommissioning progresses and the extent of structures within the Array Area reduces. Nevertheless, given the available sea room during previous phases, it is anticipated that the residual effect will remain the same as during the construction and O&M phase of the Proposed Development.

14.12.35 The magnitude of the impact is therefore high.

Sensitivity of Receptor

14.12.36 The requirement to ensure third party vessels are aware of decommissioning activities and display information on charts is also embedded in the mitigations which will enable advance passage planning. Other relevant Embedded Mitigation include site marking and charting, and a LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan).

14.12.37 Therefore, the sensitivity of the receptor is anticipated to be negligible, the same as during the construction and O&M phase.

Significance of Effect

14.12.38 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.39 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.40 The Tier 3 cumulative scenario introduces other OWFs, namely Bellrock OWF Morven North OWF and Morven South OWF. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to reduce risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.41 The NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) highlighted that these Tier 3 projects could necessitate deviations for six routes in addition to those presented in the Tier 2 assessment; Route 6b, Route 7, Route 8, Route 9, Route 12 and Route 15. The highest frequency route is Route 15 with approximately two to three vessels per day.

14.12.42 Tier 3 projects are not likely to begin construction during the construction phase of the Proposed Development, and so the magnitude of the impact is anticipated to be similar to the Tier 2 scenario, and is therefore consider to be high.

Sensitivity of Receptor

14.12.43 Section 10 of the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) presented the anticipated future routeing scenario taking the Tier 1, Tier 2 and Tier 3 proposed developments into account. The largest deviation anticipated as a result of these projects is 4.58 nm (8.48 km), along the south-south-east to north-north-west route passing east of Buchan Deep and west of Long Forties, which, on an overall coastal or international voyage distance of hundreds of nautical miles the difference is negligible and within weather and tidal tolerances. It is therefore possible that these vessels could make a small adjustment to their route at an earlier point in their transit in order to deviate around the construction areas, with minimal impact on the overall journey distance and time. There were no regular running ferry services impacts.

14.12.44 As with the Tier 2, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The sensitivity of the receptor is therefore negligible.

Significance of Effect

14.12.45 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.46 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.47 It is noted that the potential construction of Tier 3 projects during the O&M phase of the Proposed Development will have an impact on routing. Nevertheless, as is the case with Tier 2 projects, there is sufficient sea room available for deviations. The magnitude it is anticipated to be similar to the Tier 3 scenario during construction, as the vessel traffic profile and activity is the similar during construction as during decommissioning and is therefore high.

Sensitivity of Receptor

14.12.48 As with the Tier 3 during construction scenario, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The sensitivity of the receptor is therefore negligible.

Significance of Effect

14.12.49 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.50 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.51 It is noted that the presence of the Tier 3 projects during the decommissioning phase of the Proposed Development will have an impact on routing. Nevertheless, as is the case with Tier 2 projects, there is sufficient sea room available for deviations. The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction as the vessel traffic profile and activities are similar during construction and they are during decommissioning and is therefore high.

Sensitivity of Receptor

14.12.52 As with the Tier 3 construction scenario, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The sensitivity of the receptor is therefore negligible.

Significance of Effect

14.12.53 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.54 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

IMPACT 2 – INCREASED COLLISION RISK

14.12.55 As per the cumulative routeing assessment (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), some of the existing commercial and passenger ferry traffic in the area would likely be displaced and/or be required to transit between multiple wind farms, due to surrounding wind farms and/or cable installations/maintenance. Impacts on routeing may in turn lead to increased collision risk.

Tier 1

14.12.56 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.57 The Tier 2 projects in combination with the Proposed Development would not be anticipated to cause extensive spatial squeeze, with the smallest space being 13.7 nm (25.4 km) between Ossian and the Proposed Development. With regard to the available sea room, the remaining sea room is still anticipated to be sufficient to safely accommodate any required deviations and collision avoidance.

14.12.58 The Applicant will also establish appropriate vessel management systems and marine coordination to manage the potential for increase encounters with project vessels, including the NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan). These encounters will also be managed through COLREGs and SOLAS.

14.12.59 Therefore, the magnitude of impact is assessed to be low.

Sensitivity of Receptor

14.12.60 In the event of a collision, whilst the most credible outcome is minor damage and/or minor injuries, it is feasible that a worst credible collision involving a larger vessel might result in vessel holing and eventual flooding and capsize and potential loss of life, though this is considered to be very unlikely given historical incident analysis and collision risk modelling.

14.12.61 Given both the most credible and reasonable worst credible outcomes, the sensitivity of the receptor is assessed to be medium.

Significance of Effect

14.12.62 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.63 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.64 It is noted that full build out of the projects will have the largest impact on collision, as this cumulative scenario would generate the minimum amount of available sea room (maximum vessel constraint) and maximum additional project vessel traffic. Nevertheless, given the Embedded Mitigations and the sea room available for deviations and collision avoidance, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.65 Therefore, the magnitude of impact is deemed to be low.

Sensitivity of Receptor

14.12.66 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to during construction.

14.12.67 Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of Effect

14.12.68 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.69 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore,

each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.70 It is noted that the risk of collision will reduce as decommissioning progresses and the extent of structures within the Array Area reduces and available sea room increases. Nevertheless, it is anticipated that the residual effect will remain the same as during the construction and O&M phase of the Proposed Development.

14.12.71 Therefore the magnitude of impact is low.

Sensitivity of the Receptor

14.12.72 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to during construction and O&M.

14.12.73 Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of Effect

14.12.74 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.75 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Tier 3

Construction Phase

Magnitude of Impact

14.12.76 The Tier 3 cumulative scenario introduces other OWFs, namely Bellrock OWF Morven North OWF and Morven South OWF. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to reduce risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.77 The addition of the Tier 3 projects to the Tier 2 scenario introduces a number of new navigation corridors. As presented in the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), it is anticipated that routes will be deviated into corridors between Seagreen and Morven North, Bellrock, and the Proposed Development and Morven North. The smallest of these corridors is between Morven North and the Proposed Development, measuring 5.4 nm (10.0 km) at the narrowest point.

14.12.78 The addition of Tier 3 projects will cause additional vessel to be rerouted inshore of the Proposed Development causing a funnelling of vessels between the Array Area and Kincardine OWF; however, the available navigable space between the Proposed Development and Kincardine FOWF (approximately 10.9 nm (21.2 km)) is considered sufficient enough to allow safety navigation (per the wind farm shipping route template of Annex 2 of MGN 654 (MCA, 2021)). The rerouting of vessels in this area will also increase the crossing encounters with vessels transiting to/from Aberdeen on east-west routes, namely oil and gas service vessels; however, given the nature of oil and gas service vessels and their operations, the crew can be expected to operate in accordance with international COLREGS regulations.

14.12.79 Given that the available sea room is more restricted in the Tier 3 scenario and that the types of vessels observed on these routes are typically run by professionally trained operators (commercial vessels and oil and gas service vessels), a collision occurrence is considered to be unlikely and the magnitude of impact is therefore considered to be low.

Sensitivity of Receptor

14.12.80 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be the same as for Tier 2 and is therefore medium.

Significance of Effect

14.12.81 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.82 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.83 It is noted that full build out of the projects will have the largest impact on collision, as this cumulative scenario would generate the minimum amount of available sea room (maximum vessel constraint) and maximum additional project vessel traffic. Nevertheless, given the Embedded Mitigations and the sea room available for deviations and collision avoidance, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.84 Therefore, the magnitude of impact is deemed to be low.

Sensitivity of Receptor

14.12.85 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore medium.

Significance of Effect

14.12.86 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.87 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.88 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction as the vessel traffic profile and activity is the similar during construction as during decommissioning and is therefore low.

Sensitivity of Receptor

14.12.89 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore medium.

Significance of Effect

14.12.90 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.91 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

IMPACT 3 – INCREASED CONTACT/ALLISION RISK

14.12.92 As per the cumulative routeing assessment (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), some of the existing commercial and passenger ferry traffic in the area would likely be displaced around the Proposed Development and/or be required to transit between multiple projects due to surrounding wind farms and/or cable installations/maintenance. Impacts on routeing may in turn lead to increased allision risk.

Tier 1

14.12.93 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.94 Based on the cumulative routeing assessment it is likely that most vessels currently transiting within or near the Array Area will choose to pass inshore between the Proposed Development and Kincardine OWF, where there is in excess of 10 nm (18.5 km) of width of sea room available for transit (which is considered sufficient to safely accommodate additional vessel transits without unduly increasing allision risk given allision risk is localised to each development).

14.12.95 Any vessels choosing to pass further offshore will likely use either the sea space between Ossian and Bellrock, or north of Bellrock.

14.12.96 All screened in developments will be required to agree lighting and marking with the NLB to ensure navigational safety including managing allision risk. Similarly, layouts must also be agreed with the MCA and NLB, with these discussions including consideration of internal allision risk.

14.12.97 As well as the Embedded Mitigations in place, there are also the requirements for cumulative wind farms to undergo their respective risk assessments prior to development.

14.12.98 Therefore the magnitude of impact is deemed to be low.

Sensitivity of Receptor

14.12.99 In the event of an allision as a result of deviations, while the most credible outcome is minor damage and/or minor injuries, it is feasible that a worst credible allision involving a larger vessel might result in Wind Turbine collapse, or and eventual flooding of a vessel and potential loss of life, though this is considered unlikely given the marking and charting of the site and the development of an ERCoP.

14.12.100 Given the most credible and worst credible consequences, the sensitivity of the receptor is considered to be medium.

Significance of Effect

14.12.101 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.102 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.103 It is noted that full build out of the proposed offshore developments will have the largest impact on allision. Nevertheless, given the Embedded Mitigations and the sea room available for deviations, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.104 The magnitude of impact is therefore deemed to be low.

Sensitivity of Receptor

14.12.105 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 2 scenario during construction, and is therefore medium.

Significance of Effect

14.12.106 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.107 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.108 It is noted that the risk of allision will reduce as decommissioning progresses and the extent of structures within the Array Area reduces. Nevertheless, it is anticipated that the residual effect will remain the same as during the construction and O&M phase of the Proposed Development.

14.12.109 The magnitude of impact is therefore deemed to be low.

Sensitivity of Receptor

14.12.110 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to during construction and O&M. Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of Effect

14.12.111 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.112 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Tier 3

Construction Phase

Magnitude of Impact

14.12.113 The addition of the Tier 3 projects to the Tier 2 scenario introduces a number of new navigation corridors. As presented in the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), it is anticipated that routes will be deviated into corridors between Seagreen and Morven North, Bellrock and the Proposed Development and Morven North. The smallest of these corridors is between Morven North and the Proposed Development, measuring 5.4 nm (10.0 km) at the narrowest point. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support reduce risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.114 Given that the available sea room is more restricted in the Tier 3 scenario, the magnitude of impact is therefore deemed to be low.

Sensitivity of Receptor

14.12.115 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to Tier 2 and is therefore medium.

Significance of Effect

14.12.116 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.117 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.118 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction and is therefore low.

Sensitivity of Receptor

14.12.119 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to similar to the Tier 3 scenario during construction, and is therefore medium.

Significance of Effect

14.12.120 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.121 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.122 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction as the vessel traffic profile and activity is the similar during construction as during decommissioning and is therefore low.

Sensitivity of Receptor

14.12.123 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore medium.

Significance of Effect

14.12.124 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.125 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

IMPACT 4 – INCREASED GROUNDING RISK

14.12.126 Export cables associated with the Tier 2 OWFs as well as the subsea cables have the potential to reduce UKC, particularly near to shore, therefore increasing the risk of grounding. During construction of the Proposed Development, it is noted that nearshore traffic could be displaced pushing vessels closer to shore which would also increase the likelihood of a grounding event.

Tier 1

14.12.127 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.128 The Tier 2 cumulative scenario introduces other OWFs, namely Aspen OWF, Berwick Bank Wind Farm, Green Volt OWF (INTOG Site 6 Flotation Energy), Inch Cape OWF, Muir Mhòr OWF, Ossian OWF, Salamander OWF and Seagreen 1A Project. Tier 2 projects are projects that have an application submitted, are consented or under construction.

14.12.129 With the cumulative Tier 2 projects considered, there is still adequate sea room available to route around any temporary construction activities or areas where UKC is compromised. Moreover, several mitigation will be in place for all subsea infrastructure associated with the projects, such as marking and charting, compliance with MGN 654, and cable burial where feasible.

14.12.130 Therefore the magnitude of impact is considered to be low.

Sensitivity of Receptor

14.12.131 In the unlikely event of a grounding, the most credible outcome is minor injuries and minor adverse publicity. However, while unlikely, the worst credible scenario could involve loss of small craft, with a single fatality.

14.12.132 Should a vessel ground on cable protection or on the seabed as a result of deviations required as a result of the Proposed Development, the ERCoP will include provision of appropriate towage services that should be able to mitigate the consequence of the incident, by ensuring the vessel could be towed away from the cable protection if required.

14.12.133 As a result, the sensitivity of the receptor has been assessed as low. Although the credible worst credible outcome involves the potential for a single fatality, this is considered extremely unlikely due to the nature of grounding incidents and historic incident analysis.

Significance of Effect

14.12.134 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be lower than during the Proposed Development in isolation assessment.

Additional Mitigation and Residual Effect

14.12.135 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.136 During the O&M phase, once cable burial is complete, the Offshore Export Cables will not cause any vessels to divert closer to Landfall. It is possible that, in some areas where burial is not practicable and the cable is protected, some large draught vessels may divert course slightly to avoid shallower ground, or that during maintenance activities, some vessels may need to deviate around the maintenance vessel. In which case, there is considerable sea room and water depths either side of the Offshore Export Cable Corridor to enable these deviations without increasing the risk of grounding.

14.12.137 Furthermore, large project vessels will be working near Landfall much less frequently during the O&M phase compared to the construction phase, further minimising the likelihood of a grounding event.

14.12.138 Although the subsea infrastructure associated with Tier 2 projects may increase the chances of such an event occurring, Embedded Mitigation such as cable burial and marking and charting should reduce the risk of grounding. Moreover, there is adequate sea room around each asset for vessels to navigate.

14.12.139 As a result, the magnitude of impact has been assessed as negligible.

Sensitivity of Receptor

14.12.140 As the physical consequences of a vessel grounding are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated the same as during construction. As a result, the sensitivity of the receptor has been assessed as low.

Significance of Effect

14.12.141 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be substantially lower than during construction.

Additional Mitigation and Residual Effect

14.12.142 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.143 The magnitude of impact is anticipated to be the same as during construction of the Proposed Development as the vessel traffic profile and activity is the similar during construction as during decommissioning, although it is noted that as decommissioning goes on, the impact will reduce with the number of cables present. Therefore, the magnitude of impact is low.

Sensitivity of Receptor

14.12.144 As the physical consequences of a vessel grounding are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be the same as during construction of the Proposed Development, and is therefore low.

Significance of Effect

14.12.145 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will be the same as during construction.

Additional Mitigation and Residual Effect

14.12.146 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Tier 3

Construction Phase

Magnitude of Impact

14.12.147 The Tier 3 cumulative scenario introduces other OWFs, namely Bellrock OWF Morven North OWF and Morven South OWF. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. The Tier 3 cumulative scenario also introduces subsea cable projects: CNSE Project, EGL3 and EGL4.

14.12.148 Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support reduce risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.149 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of Receptor

14.12.150 As the physical consequences of a vessel grounding are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 2 scenario during construction, and is therefore low.

Significance of Effect

14.12.151 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be substantially different to the Tier 2 scenario.

Additional Mitigation and Residual Effect

14.12.152 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.153 As the vessel traffic profile in a Tier 3 scenario is not anticipated to increase to a magnitude that would affect the Proposed Development, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during O&M, and is therefore negligible.

Sensitivity of Receptor

14.12.154 As the physical consequences of a vessel grounding are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Significance of Effect

14.12.155 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be substantially different to the Tier 2 scenario.

Additional Mitigation and Residual Effect

14.12.156 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.157 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction, as the vessel traffic profile and activity is the similar during construction as during decommissioning, and is therefore low.

Sensitivity of Receptor

14.12.158 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Significance of Effect

14.12.159 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be substantially different to the Tier 2 scenario.

Additional Mitigation and Residual Effect

14.12.160 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

IMPACT 5 – POTENTIAL IMPACT TO SAR CAPABILITY

14.12.161 OWFs can impact SAR capabilities due to the presence of Wind Turbines and associated project vessels. As such there may be an increase in the number of incidents requiring emergency response or impacts to emergency response procedures.

Tier 1

14.12.162 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.163 All the proposed Tier 2 OWF projects could impact SAR capabilities due to the presence of Wind Turbines and associated project vessels. As such there may be an increase in the number of incidents requiring emergency response or impacts to emergency response procedures.

14.12.164 However, as per the incident assessment conducted within Section 6.4 of the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment), the baseline incident rates are low. Furthermore, there would be additional resources available at other projects and, as a result, there is not considered likely to be a notable effect on emergency response resources on a cumulative level.

14.12.165 As a result, the magnitude of the impact is deemed to be negligible.

Sensitivity of Receptor

14.12.166 All wind farm developments will be required to consult on layouts with the MCA, in alignment with MGN 654, and ensure suitable SAR access is available. Moreover, SAR operations within a given development will be localised to the area of the operation.

14.12.167 As a result, the sensitivity of the receptor is considered to be low.

Significance of Effect

14.12.168 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that there is the potential for a reduction in SAR capabilities, albeit a very small reduction.

Additional Mitigation and Residual Effect

14.12.169 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.170 It is noted that, while the O&M phase of the projects will have fewer project vessels transiting in the area and therefore a lower risk of incidents, the smaller presence of project vessels will also form a reduced resource to respond to any incidents in the area, both in terms of incidents associated with the Proposed Development, but also incidents occurring to third party vessels outside of the Proposed Development site. Therefore, given the Embedded Mitigations and overall low baseline incident rates, it is anticipated that the residual effect will remain similar to the construction phase of the Proposed Development.

14.12.171 As a result, the magnitude of the impact is deemed to be negligible.

Sensitivity of Receptor

14.12.172 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the Embedded Mitigations in place, the sensitivity of the receptor is anticipated to be similar to during construction and is therefore deemed to be low.

Significance of Effect

14.12.173 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that there is the potential for a reduction in SAR capabilities, albeit a very small reduction.

Additional Mitigation and Residual Effect

14.12.174 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.175 It is noted that, while the decommissioning phase of the projects will have more project vessels transiting in the area compared to during O&M, and therefore a higher risk of incidents, the greater presence of project vessels will also form an additional resource to respond to any incidents in the area, both in terms of incidents associated with the Proposed Development, but also incidents occurring to third party vessels outside of the Proposed Development site. Moreover, as decommissioning progresses and the extent of structures within the Array Area reduces and available sea room increases, the risk of incidents requiring SAR is reduced. Therefore, given the Embedded Mitigations and overall low baseline incident rates, it is anticipated that the residual effect will remain similar to the construction and O&M phase of the Proposed Development.

14.12.176 As a result, the magnitude of the impact is deemed to be negligible.

Sensitivity of Receptor

14.12.177 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the Embedded Mitigations in place, the sensitivity of the receptor is anticipated to be similar to during construction and is therefore deemed to be low.

14.12.178 As a result, the sensitivity of the receptor is deemed to be low.

Significance of Effect

14.12.179 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that there is the potential for a reduction in SAR capabilities, albeit a very small reduction.

Additional Mitigation and Residual Effect

14.12.180 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Tier 3

Construction Phase

Magnitude of Impact

14.12.181 The Tier 3 cumulative scenario introduces other OWFs, namely Bellrock OWF, Morven North OWF and Morven South OWF. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. The Tier 3 cumulative scenario also introduces subsea cable projects: CNSE Project, EGL3 and EGL4.

14.12.182 Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support reduce risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.183 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of Receptor

14.12.184 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the Embedded Mitigations in place, the sensitivity of the receptor is anticipated to be the same as for Tier 2 and is therefore deemed to be low.

Significance of Effect

14.12.185 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that the risk profile of the Tier 3 scenario is considered to be the same as for Tier 2.

Additional Mitigation and Residual Effect

14.12.186 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.187 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of the Receptor

14.12.188 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the Embedded Mitigations in place, the sensitivity of the receptor is anticipated to be the same as for Tier 2 and is therefore deemed to be low.

Significance of Effect

14.12.189 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that the risk profile of the Tier 3 scenario is considered to be the same as for Tier 2.

Additional Mitigation and Residual Effect

14.12.190 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.191 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of the Receptor

14.12.192 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the Embedded Mitigations in place, the sensitivity of the receptor is anticipated to be the same as for Tier 2 and is therefore deemed to be low.

Significance of Effect

14.12.193 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered to be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that the risk profile of the Tier 3 scenario is considered to be the same as for Tier 2.

Additional Mitigation and Residual Effect

14.12.194 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

IMPACT 6 - INTERFERENCE WITH RADAR, COMMUNICATIONS AND POSITIONING SYSTEMS

14.12.195 All subsea cable and OWF projects could impact equipment used for navigation, collision avoidance and communications (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment).

Tier 1

14.12.196 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.197 All the proposed Tier 2 projects could impact equipment used for navigation, collision avoidance and communications, as well as masking sound signals from vessels or AtoNs. This cumulative scenario generates a greater number of Wind Turbines than the project-alone scenario and therefore a greater potential to exacerbate the impacts on marine navigation, communications and positioning systems.

14.12.198 As a result, the magnitude of the impact is deemed to be high, due to the increased number of developments.

Sensitivity of the Receptor

14.12.199 While the increased number of Wind Turbines and cables may increase the frequency with which some of the impacts are felt, adverse impacts are still very unlikely to be felt regularly given the sea room that will be available between projects, enabling vessels to still maintain a sufficient distance from the Wind Turbines to reduce the impacts, such as on marine radar.

14.12.200 Therefore the sensitivity of the receptor is considered to be negligible.

Significance of Effect

14.12.201 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.202 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.203 It is noted that full build out of the proposed offshore developments will have the largest impact on communications and radar. Nevertheless, given the Embedded Mitigations and the sea room available, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.204 As a result, the magnitude of the impact is deemed to be high, due to the increased number of developments.

Sensitivity of the Receptor

14.12.205 The severity of effects caused by the project infrastructure are independent of the project phase and so the sensitivity of the receptor is anticipated to be negligible, the same as during construction.

Significance of Effect

14.12.206 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.207 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.208 It is noted that the impact on communications and radar will reduce as decommissioning progresses and the extent of structures within the Array Area reduces. Nevertheless, it is anticipated that the residual effect will remain the same as during the construction and O&M phase of the Proposed Development.

14.12.209 As a result, the magnitude of the impact is deemed to be high.

Sensitivity of the Receptor

14.12.210 The severity of effects caused by the project infrastructure are independent of the project phase and so the sensitivity of the receptor is anticipated to be negligible, the same as during construction and O&M.

Significance of Effect

14.12.211 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.212 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Tier 3

Construction Phase

Magnitude of Impact

14.12.213 The Tier 3 cumulative scenario introduces other OWFs, namely Bellrock OWF Morven North OWF and Morven South OWF. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. The Tier 3 cumulative scenario also introduces subsea cable projects: CNSE Project, EGL3 and EGL4.

14.12.214 Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs, CBRAs and post-consent management plans to support reduce risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.215 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is high.

Sensitivity of Receptor

14.12.216 While the increased number of Wind Turbines and cables in a Tier 3 scenario may increase the frequency with which some of the impacts are felt, adverse impacts are still very unlikely to be felt regularly given the sea room that will be available between projects, therefore the sensitivity of the receptor is anticipated to be negligible, the same as during Tier 2.

Significance of Effect

14.12.217 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.218 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.219 As a full build out of Tier 2 and Tier 3 scenarios presents the highest likelihood of an interruption to radar and marine communications, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during O&M, and is therefore considered to be high.

Sensitivity of the Receptor

14.12.220 While the increased number of Wind Turbines and cables in a Tier 3 scenario may increase the frequency with which some of the impacts are felt, adverse impacts are still very unlikely to be felt regularly given the sea room that will be available between projects, therefore the sensitivity of the receptor is anticipated to be negligible, the same as during Tier 2.

Significance of Effect

14.12.221 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.222 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.223 Whilst it is acknowledged that as decommissioning progresses and less project-related infrastructure is present, the likelihood of disturbance to radar and marine communications systems reduces. However, the decommissioning phase also encompasses the beginning of this phase, where the Proposed Development and full build out of Tier 2 and 3 projects are in place which still present the highest likelihood of an impact. Therefore, the magnitude of the impact is anticipated to be high, the same as during Tier 2.

Sensitivity of the Receptor

14.12.224 While the increased number of Wind Turbines and cables in a Tier 3 scenario may increase the frequency with which some of the impacts are felt, adverse impacts are still very unlikely to be felt regularly given the sea room that will be available between projects. The sensitivity of impacts is also independent of the project phase therefore the sensitivity of the receptor is anticipated to be negligible, the same as during construction and O&M.

Significance of Effect

14.12.225 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.226 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

IMPACT 7 - REDUCTION IN UNDER KEEL CLEARANCE DUE TO SUBSURFACE OFFSHORE INFRASTRUCTURE

14.12.227 The cumulative scenario introduces a higher quantity of subsea infrastructure, which have the potential to cause a reduction in UKC (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment).

Tier 1

14.12.228 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.229 The cumulative scenario introduces a higher quantity of subsea infrastructure, albeit these will all be similar in nature to those associated with the Proposed Development and there will be adequate sea room should vessels want to navigate around such assets.

14.12.230 The magnitude of impact is therefore deemed to be the same as during construction of the Proposed Development in isolation, and is low.

Sensitivity of the Receptor

14.12.231 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced UKC is experienced locally within the individual projects. Therefore the sensitivity of the receptor is deemed to be the same as for the construction phase of the Proposed Development in isolation, and is medium.

Significance of Effect

14.12.232 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.233 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.234 During the O&M phase of the Proposed Development, the reduction of UKC due to subsurface infrastructure outside of the Array Area is anticipated to impact vessels (both transiting and fixed fishing gear vessels) with the same frequency as is anticipated during the construction phase. There is still considered to be adequate sea room, the same as during the construction phase.

14.12.235 For small vessels such as fishing vessels and recreational vessels which may transit within the Array Area post-construction, the IACs and foundation moorings have potential to cause a reduction in UKC. Fishing vessels are at a higher risk due to the gear which they may deploy in proximity to subsea infrastructure. It is noted however that Embedded Mitigation of marking and charting of subsea cables and NtMs will make fishermen aware of these risks, and it would be unlikely they would deploy gear where unsafe to do so. The presence of the Tier 2 projects in combination is not anticipated to make the impact more likely.

14.12.236 Therefore the magnitude of the impact is considered to be low.

Sensitivity of the Receptor

14.12.237 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced UKC is experienced locally within the individual projects. Therefore, the sensitivity of the receptor is deemed to be the same as for the O&M phase of the Proposed Development in isolation, and is medium.

Significance of Effect

14.12.238 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.239 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.240 The magnitude of the impact is considered to be the same as during the construction phase as the vessel traffic profile and activity will be highly similar and is therefore low.

Sensitivity of the Receptor

14.12.241 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced UKC is experienced locally within the individual projects. In addition, the vessel traffic profile and activities will be similar to the construction phase. Therefore, the sensitivity of the receptor is deemed to be the same as for the construction phase and is medium.

Significance of Effect

14.12.242 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.243 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Tier 3

Construction Phase

Magnitude of Impact

14.12.244 The Tier 3 cumulative scenario introduces other OWFs, namely Bellrock OWF Morven North OWF and Morven South OWF. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. The Tier 3 cumulative scenario also introduces subsea cable projects: CNSE Project, EGL3 and EGL4.

14.12.245 Similar to the Tier 2 assessment, this means there may be a further increase in subsurface infrastructure. However, each OWF development is expected to have similar mitigations supported by detailed NRAs, CBRAs and post-consent management plans to support minimising risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.246 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario and is low.

Sensitivity of Receptor

14.12.247 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced UKC is experienced locally within the individual projects. Therefore, the sensitivity of the receptor is deemed to be the same as for Tier 2 and is medium.

Significance of Effect

14.12.248 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.249 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.250 As is the case for the Tier 2, the increase in project traffic in conjunction with Tier 3 is unlikely to affect the likelihood of the impact and therefore, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during O&M, and is low.

Sensitivity of the Receptor

14.12.251 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced UKC is experienced locally within the individual projects. Therefore, the sensitivity of the receptor is deemed to be the same as for construction and is medium.

Significance of Effect

14.12.252 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.253 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.254 As is the case for the Tier 2, the increase in project traffic in conjunction with Tier 3 is unlikely to affect the likelihood of the impact and therefore, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during decommissioning, and is low.

Sensitivity of the Receptor

14.12.255 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced UKC is experienced locally within the individual projects. Therefore, the sensitivity of the receptor is deemed to be the same as for construction and is medium.

Significance of Effect

14.12.256 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.257 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

IMPACT 8 - POTENTIAL IMPACT ON PORTS/HARBOURS AND OTHER NEARSHORE OPERATIONS

Tier 1

14.12.258 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.259 The Array Area is located approximately 21.5 nm (39.8 km) from the Port of Aberdeen and 35 nm (64.8 km) from the Port of Montrose. Therefore there would be a negligible impact on ports and harbours from the Array Area. Given the depth of water and available sea room, it is not anticipated that the construction of the Offshore Export Cables will adversely affect the ability for vessels to access ports.

14.12.260 The base port(s) for the construction, O&M and decommissioning phases of the project are not yet identified. Consequently, it is not possible at this stage to assess potential impacts of project-related vessel movements on specific ports and harbours. The selection of a base port is expected to take account of the suitability of existing port and harbour infrastructure to accommodate the anticipated vessel types, frequencies, and traffic levels associated with the project, as well as navigational access, capacity, and existing baseline activity. Taking these factors into consideration will ensure that the impact to the base port(s) will be reduced. The addition of the Tier 2 projects will mean there is an increase in wind farm related vessel traffic in proximity to ports and harbours. However, the base ports for the other projects, too, are not yet defined and will be determined post-consent.

14.12.261 In addition, vessels associated with the construction of the Proposed Development are not anticipated to notably increase overall baseline traffic levels in the area, with a maximum of 25 construction vessels required on site at any one time for the Array Area and 16 for the Offshore Export Cables. It is anticipated that the Tier 2 projects will introduce similar levels of vessel traffic which would further increase the level of traffic in the vicinity of those OWFs. Marine coordination and vessel procedures will be in place to manage project vessel movements and reduce disruption to third party vessels as per the proposed NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan). As such, no notable impact on port access is expected from the construction vessels, noting any interactions with third party vessels would be managed via COLREGS in addition to the marine coordination procedures.

14.12.262 Given the distance of the Offshore Export Cables from the ports is a minimum of 7.6 nm (14.1 km) to the Port of Montrose and the Embedded Mitigation that ensure management of project vessels, the magnitude of impact on access to the ports is assessed to be low.

Sensitivity of the Receptor

14.12.263 Given the traffic volumes serving the local ports, and the minimal amount of disruption that would likely be experienced in the event that access is impacted, the sensitivity of the receptor is considered to be low.

Significance of Effect

14.12.264 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, significance could be assessed as negligible or minor. The significance of effect for this hazard is considered as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.12.265 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.266 The likelihood of there being an impact to local ports and harbours as a result of the Proposed Development in combination with Tier 2 projects is considered to be much the same as during construction as associated vessel traffic will remain in operation throughout the projects lifecycle and not differ drastically. Therefore, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.12.267 Given the minimal amount of disruption that would likely be experienced in the event that port access is impacted, the sensitivity of the receptor is considered to be low.

Significance of Effect

14.12.268 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.12.269 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.270 As with during construction, marine coordination and vessel procedures will be in place to manage project vessel movements and reduce disruption to third party vessels as per the proposed NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan). As such, no notable impact on port access is expected from the construction vessels and so the magnitude of impact on access to the ports is assessed to be low.

Sensitivity of the Receptor

14.12.271 As with during construction, given the minimal amount of disruption that would likely be experienced in the event that port access is impacted, the sensitivity of the receptor is considered to be low.

Significance of Effect

14.12.272 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.12.273 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Tier 3

Construction Phase

Magnitude of Impact

14.12.274 The Tier 3 cumulative scenario introduces other OWFs, namely Bellrock OWF Morven North OWF and Morven South OWF. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis.

14.12.275 Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimising risk and impacts to third parties, its own infrastructure and operations during this phase. As well as the Tier 2 projects, no base port has been defined for the Tier 3 projects.

14.12.276 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.277 The traffic volumes serving the local ports is not anticipated to differ to the Tier 2 scenario, and a minimal amount of disruption would likely be experienced in the event that access is impacted, therefore the sensitivity of the receptor is considered to be low.

Significance of Effect

14.12.278 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.12.279 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.280 The likelihood of there being an impact to local ports and harbours as a result of the Proposed Development in combination with Tier 3 projects is considered to be much the same as during construction as associated vessel traffic will remain in operation throughout the projects lifecycle and not differ drastically. Therefore, the magnitude of impact has been assessed as similar to Tier 3 construction and is low.

Sensitivity of the Receptor

14.12.281 The traffic volumes serving the local ports is not anticipated to differ to the Tier 2 scenario, and a minimal amount of disruption would likely be experienced in the event that access is impacted, therefore the sensitivity is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Significance of Effect

14.12.282 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.12.283 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.284 The likelihood of there being an impact to local ports and harbours as a result of the Proposed Development in combination with Tier 3 projects is considered to be much the same as during construction as associated vessel traffic and activities are similar during construction as during decommissioning. Therefore, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.12.285 The traffic volumes serving the local ports is not anticipated to differ to the Tier 2 scenario, and a minimal amount of disruption would likely be experienced in the event that access is impacted, therefore the sensitivity is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Significance of Effect

14.12.286 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, significance could be assessed as negligible or minor. The likely significance of effect for this hazard is considered as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.12.287 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

IMPACT 9 - POTENTIAL IMPACT ON SMALL VESSEL ACTIVITY (INCLUDING FISHING AND RECREATION)

Tier 1

14.12.288 No cumulative effects are anticipated as a result of the Bowdun Onshore Infrastructure, due to the lack of interaction between the onshore and offshore project components.

Tier 2

Construction Phase

Magnitude of Impact

14.12.289 Fishing and recreational vessel activity throughout the Shipping and Navigation Study Area is presented in Section 6.3 of the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment) and further information on fishing is located in Volume 2, Chapter 13: Commercial Fisheries. It is noted in the MDS that the presence of all projects undergoing construction or operation together will have the greatest impact on small vessels, as this would generate the greatest number of deviations and allision risks.

14.12.290 Concentrated areas of active fishing include areas 1.2 nm to 2.5 nm (2.2 km to 4.6 km) south-west of the Offshore Export Cable Corridor Landfall, 5 nm to 10 nm (9.3 km to 18.5 km) north-east of the Array Area, and intersecting the northern and western sides of the Array Area (Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment). Much of the offshore fishing activity is undertaken by trawlers. Recreational vessel activity within the Shipping and Navigation Study Area was focused closer to the coastline east of the Array Area, with little activity in the Array Area itself. In the cumulative scenario, small vessels which may have deviated to avoid Proposed Development activities will have adequate sea room to make safe deviations.

14.12.291 Given the available space around the Array Area in the cumulative scenario, the magnitude of impact is anticipated to be similar to the Proposed Development in isolation scenario, and is therefore low.

Sensitivity of Receptor

14.12.292 The available sea room is considered to remain sufficient for safe navigation and collision avoidance, and the cumulative impacts will be limited to the discrete areas where construction works are ongoing simultaneously which is likely to be short term in nature.

14.12.293 Therefore, the sensitivity to the receptor is anticipated to be the same as in the Proposed Development in isolation scenario, and is deemed to be medium, given the Embedded Mitigations and most credible and reasonable worst credible outcomes of the impact.

Significance of Effect

14.12.294 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Additional Mitigation and Residual Effect

14.12.295 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.296 It is noted that the full build out of the Proposed Development during O&M will have the largest impact on small vessels given the greatest presence of surface and subsurface infrastructure. Nevertheless, given the sea room available for deviations and the small additional distances, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.297 The magnitude of impact is therefore low.

Sensitivity of the Receptor

14.12.298 Given that project vessels will be in operation throughout the project lifecycle, the sensitivity of the receptor is likely to be similar to during construction and is therefore medium.

Significance of Effect

14.12.299 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Additional Mitigation and Residual Effect

14.12.300 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.301 It is noted that that the impact on small vessels will reduce as decommissioning progresses and the extent of structures within the Array Area and subsurface infrastructure reduces. Nevertheless, it is anticipated that the residual effect will remain the same as during the construction and O&M phases of the Proposed Development.

14.12.302 The magnitude of impact is therefore low.

Sensitivity of the Receptor

14.12.303 The sensitivity of the receptor is anticipated to be the same as during the construction phase of the Proposed Development as the vessel traffic profile and activity is the similar during construction as during decommissioning so is therefore medium.

Significance of Effect

14.12.304 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Additional Mitigation and Residual Effect

14.12.305 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Tier 3

Construction Phase

Magnitude of Impact

14.12.306 The Tier 3 cumulative scenario introduces other OWFs, namely Bellrock OWF Morven North OWF and Morven South OWF. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. The Tier 3 cumulative scenario also introduces subsea cable projects: CNSE Project, EGL3 and EGL4.

14.12.307 Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimising risk and impacts to third parties, its own infrastructure and operations during this phase. Installation of the subsea cable projects are not expected to inhibit port access, and moreover, any cable installation activities will be temporary and localised.

14.12.308 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.309 The available sea room is considered to remain sufficient for safe navigation and collision avoidance. As a result, the build out of Tier 3 projects is not anticipated to have an effect on the sensitivity of the receptor which is deemed to be the same as for Tier 2 and is scored as medium.

Significance of Effect

14.12.310 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Additional Mitigation and Residual Effect

14.12.311 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

O&M Phase

Magnitude of Impact

14.12.312 It is noted that the full build out of the Proposed Development during O&M will have the largest impact on small vessels given the greatest presence of surface and subsurface infrastructure. Nevertheless, given the sea room available for deviations and the small additional distances, it is anticipated that the residual effect will remain the same as during the Tier 3 construction phase of the Proposed Development and is therefore low.

Sensitivity of the Receptor

14.12.313 The available sea room is considered to remain sufficient for safe navigation and collision avoidance. As a result, the build out of Tier 3 projects is not anticipated to have an effect on the sensitivity of the receptor which is deemed to be the same as for Tier 2 and is scored as medium.

Significance of Effect

14.12.314 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Additional Mitigation and Residual Effect

14.12.315 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Decommissioning Phase

Magnitude of Impact

14.12.316 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction as the vessel traffic profile and activities are similar during construction as in decommissioning, and is therefore scored as low.

Sensitivity of the Receptor

14.12.317 The available sea room is considered to remain sufficient for safe navigation and collision avoidance. As a result, the build out of Tier 3 projects is not anticipated to have an effect on the sensitivity of the receptor which is deemed to be the same as for Tier 2 and is scored as medium.

Significance of Effect

14.12.318 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Additional Mitigation and Residual Effect

14.12.319 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms. Furthermore, each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

14.13 Proposed Monitoring

14.13.1 No specific shipping and navigation monitoring of cumulative effects is proposed above those already proposed in Section 14.9.

14.14 Transboundary Effects

14.14.1 A screening of transboundary effects has been carried out (see Volume 3 Appendix 4.5: Transboundary Effects Screening) and any potential for significant transboundary effects with regard to shipping and navigation from the Proposed Development upon the interests of European Economic Area (EEA) states has been assessed as part of the EIA.

14.14.2 A transboundary effect assessment assesses the potential shipping and navigation effects from the Proposed Development upon the interests of EEA states.

14.14.3 Each individual vessel may be internationally owned or operating between ports in different states. These impacts have been captured and assessed within this chapter and Volume 3, Technical Appendix 14.1: Shipping and Navigation Navigational Risk Assessment.

14.14.4 It is determined that there are no likely significant transboundary effects as a result of the Proposed Development.

14.15 Summary of Impacts, Mitigation, Likely Significant Environmental Effects and Monitoring

14.15.1 Information on shipping and navigation within the Shipping and Navigation Study Area was collected through a review of desktop sources and survey as outlined in Section 14.5 This information is summarised in Table 14.4 and Table 14.5.

14.15.2 Table 14.18 presents a summary of the potential impacts, Embedded Mitigation and the conclusion of likely significant environmental effects in EIA terms in respect to shipping and navigation from the Proposed Development. The impacts assessed include:

- deviation of commercial vessels;
- increased collision risk;
- increased contact/allision risk;
- increased grounding risk;
- potential impact to SAR capability;
- interference with Radar, communications and positioning systems;
- reduction in UKC due to subsurface Offshore Infrastructure;
- potential impact on ports/harbours and other nearshore operations; and
- potential impact on small vessel activity (including fishing and recreation).

14.15.3 Overall, it is concluded that there will be no likely significant effects arising from the Proposed Development during the construction, O&M or decommissioning phases of the Proposed Development.

14.15.4 Table 14.19 presents a summary of the CEA including potential impacts, Embedded Mitigation and the conclusion of likely significant effects on shipping and navigation in EIA terms. The cumulative effects assessed are the same impacts as listed above for the assessment of the Proposed Development in isolation.

14.15.5 Overall, it is concluded that there will be no likely significant cumulative effects from the Proposed Development alongside other projects.

14.15.6 No likely significant transboundary effects have been identified in regard to effects of the Proposed Development.

Table 14.18: Summary of Assessment of Significance

Description of Impact	Embedded Mitigation ID	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Construction Phase							
Impact 1: Deviation of commercial vessels	7, 9, 12, 16, 41	Medium	Negligible	Minor adverse	None required.	Minor adverse	None
Impact 2: Increased collision risk	5, 7, 8, 9, 11, 12, 16, 18, 23, 41, 42, 48	Low	Medium	Minor adverse	None required.	Minor adverse	None
Impact 3: Increased contact/allision risk	5, 7, 11, 12, 13, 16, 17, 18, 20, 21, 24, 41, 42, 48	Low	Medium	Minor adverse	None required.	Minor adverse	None
Impact 4: Increased grounding risk	1, 2, 4, 17, 43, 47, 49	Low	Low	Minor adverse	None required.	Minor adverse	None
Impact 5: Potential impact to SAR capability	5, 22, 24, 41	Negligible	Low	Negligible adverse	None required.	Negligible adverse	None
Impact 6: Interference with Radar, communications and positioning systems	1, 4	Medium	Negligible	Minor adverse	None required.	Minor adverse	None
Impact 7: Reduction in UKC due to subsurface Offshore Infrastructure	1, 2, 4, 17, 43, 47, 49	Low	Medium	Minor adverse	None required.	Minor adverse	None
Impact 8: Potential impact on ports/harbours and other nearshore operations	1, 7, 9, 12	Low	Low	Minor adverse	None required.	Minor adverse	None
Impact 9: Potential impact on small vessel activity (including fishing and recreation)	1, 7, 9, 11, 12, 41	Low	Medium	Minor adverse	None required.	Minor adverse	None

Description of Impact	Embedded Mitigation ID	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
O&M Phase							
Impact 1: Deviation of commercial vessels	7, 9, 12, 16, 41	Medium	Low	Minor adverse	None required.	Minor adverse	None
Impact 2: Increased collision risk	5, 7, 8, 9, 11, 12, 16, 18, 23, 41, 42, 48	Negligible	Medium	Minor adverse	None required.	Minor adverse	None
Impact 3: Increased contact/allision risk	5, 7, 11, 12, 13, 16, 17, 18, 20, 21, 24, 41, 42, 48	Low	Medium	Minor adverse	None required.	Minor adverse	None
Impact 4: Increased grounding risk	1, 2, 4, 17, 43, 47, 49	Negligible	Low	Minor adverse	None required.	Minor adverse	None
Impact 5: Potential impact to SAR capability	5, 22, 24, 41	Negligible	Low	Negligible adverse	None required.	Negligible adverse	None
Impact 6: Interference with Radar, communications and positioning systems	1, 4	Medium	Negligible	Minor adverse	None required.	Minor adverse	None
Impact 7: Reduction in UKC due to subsurface Offshore Infrastructure	1, 2, 4, 17, 43, 47, 49	Low	Medium	Minor adverse	None required.	Minor adverse	None
Impact 8: Potential impact on ports/harbours and other nearshore operations	1, 7, 9, 12	Low	Low	Minor adverse	None required.	Minor adverse	None
Impact 9: Potential impact on small vessel activity (including fishing and recreation)	1, 7, 9, 11, 12, 41	Low	Medium	Minor adverse	None required.	Minor adverse	None
Decommissioning Phase							
Impact 1: Deviation of commercial vessels	7, 9, 12, 16, 34, 41	Medium	Negligible	Minor adverse	None required.	Minor adverse	None

Description of Impact	Embedded Mitigation ID	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Impact 2: Increased collision risk	5, 7, 8, 9, 11, 12, 16, 18, 23, 34, 41, 42, 48	Low	Medium	Minor adverse	None required.	Minor adverse	None
Impact 3: Increased contact/allision risk	5, 7, 11, 12, 13, 16, 17, 18, 20, 21, 24, 34, 41, 42, 48	Low	Medium	Minor adverse	None required.	Minor adverse	None
Impact 4: Increased grounding risk	1, 2, 4, 17, 34, 43, 47, 49	Low	Low	Minor adverse	None required.	Minor adverse	None
Impact 5: Potential impact to SAR capability	5, 22, 24, 34, 41	Negligible	Low	Negligible adverse	None required.	Negligible adverse	None
Impact 6: Interference with Radar, communications and positioning systems	1, 4	Medium	Negligible	Minor adverse	None required.	Minor adverse	None
Impact 7: Reduction in UKC due to subsurface Offshore Infrastructure	1, 2, 4, 17, 34, 43, 47, 49	Low	Medium	Minor adverse	None required.	Minor adverse	None
Impact 8: Potential impact on ports/harbours and other nearshore operations	1, 7, 9, 12	Low	Low	Minor adverse	None required.	Minor adverse	None
Impact 9: Potential impact on small vessel activity (including fishing and recreation)	1, 7, 9, 11, 12, 34, 41	Low	Medium	Minor adverse	None required.	Minor adverse	None

Table 14.19: Summary of CEA

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Construction Phase							
Deviation of commercial vessels	Tier 2, 3 and 4.	High	Negligible	Minor adverse	None required.	Minor adverse	None
Increased collision risk	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None
Increased contact/allision risk	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None
Increased grounding risk	Tier 2, 3 and 4.	Low	Low	Minor adverse	None required.	Minor adverse	None
Potential impact to SAR capability	Tier 2, 3 and 4.	Negligible	Low	Minor adverse	None required.	Minor adverse	None
Interference with Radar, communications and positioning systems	Tier 2, 3 and 4.	High	Negligible	Minor adverse	None required.	Minor adverse	None
Reduction in UKC due to subsurface Offshore Infrastructure	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None
Potential impact on ports/harbours and other nearshore operations	Tier 2, 3 and 4.	Low	Low	Minor adverse	None required.	Minor adverse	None
Potential impact on small vessel activity (including fishing and recreation)	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None
O&M Phase							
Deviation of commercial vessels	Tier 2, 3 and 4.	High	Negligible	Minor adverse	None required.	Minor adverse	None.

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Increased collision risk	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None.
Increased contact/allision risk	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None.
Increased grounding risk	Tier 2, 3 and 4.	Negligible	Low	Minor adverse	None required.	Minor adverse	None.
Potential impact to SAR capability	Tier 2, 3 and 4.	Negligible	Low	Minor adverse	None required.	Minor adverse	None.
Interference with Radar, communications and positioning systems	Tier 2, 3 and 4.	High	Negligible	Minor adverse	None required.	Minor adverse	None.
Reduction in UKC due to subsurface Offshore Infrastructure	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None.
Potential impact on ports/harbours and other nearshore operations	Tier 2, 3 and 4.	Low	Low	Minor adverse	None required.	Minor adverse	None.
Potential impact on small vessel activity (including fishing and recreation)	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None.
Decommissioning Phase							
Deviation of commercial vessels	Tier 2, 3 and 4.	High	Negligible	Minor adverse	None required.	Minor adverse	None.
Increased contact/allision risk	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None.
Increased allision risk	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None.

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Increased grounding risk	Tier 2, 3 and 4.	Low	Low	Minor adverse	None required.	Minor adverse	None.
Potential impact to SAR capability	Tier 2, 3 and 4.	Negligible	Low	Minor adverse	None required.	Minor adverse	None.
Interference with Radar, communications and positioning systems	Tier 2, 3 and 4.	High	Negligible	Minor adverse	None required.	Minor adverse	None.
Reduction in UKC due to subsurface Offshore Infrastructure	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None.
Potential impact on ports/harbours and other nearshore operations	Tier 2, 3 and 4.	Low	Low	Minor adverse	None required.	Minor adverse	None.
Potential impact on small vessel activity (including fishing and recreation)	Tier 2, 3 and 4.	Low	Medium	Minor adverse	None required.	Minor adverse	None.

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