# MachairWind Offshore Windfarm

## Chapter 21 Major Accidents and Disasters

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## GLOSSARY OF ACRONYMS

| Term | Definition |
|---|---|
| ALARP | As Low As Reasonably Practicable |
| CaP | Cable Plan |
| COLREG | Convention on International Regulations for Preventing Collisions at Sea |
| ECC | Export Cable Corridor |
| EEA | European Economic Area |
| EIA | Environmental Impact Assessment |
| EIAR | Environmental Impact Assessment Report |
| ERCoP | Emergency Response and Cooperation Plan |
| HAT | Highest Astronomical Tide |
| HSE | Health and Safety Executive |
| HVDC | High Voltage Direct Current |
| IEMA | Institute of Environmental Management and Assessment |
| IFP | Instrument Flight Procedure |
| IMO | International Maritime Organization |
| LMP | Lighting and Marking Plan |
| LSE | Likely Significant Effect |
| MAIB | Marine Accident Investigation Branch |
| MD-LOT | Marine Directorate Licensing and Operations Team |
| MD-SEDD | Marine Directorate Science Evidence, Data and Digital |
| NLB | Northern Lighthouse Board |
| O&M | Operation and Maintenance |
| OnTDA | Onshore Transmission and Development Area |
| OSP | Offshore Substation Platform |
| OVMPNSP | Outline Vessel Management Plan and Navigational Safety Plan |
| SAR | Search and Rescue |
| SOLAS | Safety of Life at Sea |
| UXO | Unexploded Ordnance |
| WDA | Windfarm Development Area |
| WTG | Wind Turbine Generator |

## GLOSSARY OF TERMS

| Term | Definition |
|---|---|
| Allision | The act of striking or collision of a moving vessel against a stationary object. |
| Cable protection | Protective measure to minimise the effects of scour and hazards along the offshore cables (e.g. to prevent cable exposure or snagging of vessel anchors or fishing gear), as well as for protecting these cables at infrastructure crossing points. |
| Climate Change Impact | Climate Change Impact is defined as an impact from a climate hazard, such as asset damage or failure, which affects the ability of the receptor to maintain its function or purpose. |
| Collision | The act or process of two moving objects colliding. |
| Development Area | Application boundary for consenting purposes which, for the Project, consists of a Windfarm Development Area, Offshore Export Cable Corridor, and Onshore Transmission Development Area. Separate consent and marine licence applications will be submitted for each Development Area where applicable. |
| Embedded mitigation measure | Mitigation measures, including industry good practice measures, that are directly incorporated into the design for the MachairWind Windfarm Development Area to avoid or reduce environmental effects. |
| Environmental Impact Assessment (EIA) | The process of evaluating the likely significant environmental effects of a proposed development over and above the existing circumstances (or 'baseline'). |
| Inter-array cables (IACs) | Armoured cable containing electrical and fibre optic cores which link the wind turbine generators to each other and to the offshore substation platform(s). |
| MachairWind Offshore Windfarm | An offshore windfarm capable of exporting around 2 GW of renewable energy to the National Electricity Transmission System. MachairWind Offshore Windfarm comprises three Development Areas:<br>• The WDA – located on the west coast of Scotland to the northwest of Islay and west of Colonsay;<br>• The Offshore Export Cable Corridor – a preliminary boundary extending from the WDA to mean high water springs at a landfall location near Girvan, South Ayrshire; and<br>• The Onshore Transmission Development Area – a preliminary boundary which extends landward from mean low water springs and includes the land required for the landfall of the offshore export cables and their route up to but not including the proposed high voltage direct current switching station which will be developed and constructed by Transmission Owner, ScottishPower Transmission.<br>Separate consent and licence applications will be submitted for each Development Area. |
| Offshore export cable | Armoured cable containing electrical cores between the offshore substation platform(s) and landfall. Offshore export cables will include bundled fibre optic cables. The offshore export cables are subject to Marine Licence applications under the Marine (Scotland) Act 2010. The portion of the offshore export cable(s) located within the WDA is assessed as part of this MachairWind WDA EIA and a marine licence application to construct, alter or improve this portion has been submitted alongside the WDA application. A separate marine licence application will be submitted for the portion of the offshore export cable(s) from the WDA boundary to mean high water Mean High Water Springs. |
| Offshore Export Cable Corridor (ECC) | The preliminary boundary extending from the WDA to mean high water springs near Girvan, South Ayrshire and within which the offshore export cable(s) will be located. A separate marine licence application will be submitted for the offshore export cable(s) located within the Offshore ECC. |
| Offshore Substation Platform (OSP) | An offshore platform with a fixed foundation located within the WDA which houses electrical equipment such as transformers, switchgear, protection and control systems, and enables |

| Term | Definition |
|---|---|
| | the windfarm's renewable electricity to be collected via inter-array cables and exported to the National Electricity Transmission System via offshore export cables. |
| Offshore Substation Platform (OSP) link cables | Electrical cables which link OSPs (if more than one OSP is required). These cables will include fibre optic cores or bundled fibre optic cables. OSP link cables will be wholly located within the WDA. |
| Onshore Transmission Development Area (OnTDA) | The preliminary boundary which extends landward from mean low water springs and includes the land required for the landfall of the offshore export cables and their route up to but not including the proposed high voltage direct current switching station which will be developed and constructed by Transmission Owner, ScottishPower Transmission. This Transmission Owner is responsible for consenting the high voltage direct current switching station. Onward connections to the National Electricity Transmission System will be consented by National Grid Electricity Transmission and ScottishPower Transmission. Where relevant, these are considered as part of cumulative effects assessment in the EIA. |
| Operational life | The operational life is the expected length of time from final commissioning of the WDA until the cessation of commercial operations. This is anticipated to be 35 years. |
| Pre-construction works | Pre-construction works are activities undertaken prior to formal commencement of construction. Examples include survey works such as geotechnical and geophysical surveys and seabed preparation activities. |
| Safety zones | An area of water around or adjacent to a wind turbine generator or Offshore Substation Platform and associated substructure which is to be constructed, extended, operated or decommissioned, from which certain or all classes of vessels are excluded and within which activities can be regulated for the purpose of securing safety of the wind turbine generator, substructure or vessels in that vicinity, and individuals on both the wind turbine generator, substructure or vessel, in line with Section 95 of the Energy Act 2004. |
| ScotWind | A Crown Estate Scotland seabed leasing round which enabled developers propose offshore wind projects and apply for seabed rights to plan and build windfarms in Scottish waters. |
| Scour protection | Protective measures to avoid sediment being eroded away from the base of the wind turbine generator foundations as a result of the flow of water. |
| The Applicant | The legal entity submitting consent applications for the MachairWind Offshore Windfarm, namely MachairWind Limited. |
| The Lighthouse | The Dubh Artach lighthouse. |
| The Project | MachairWind Offshore Windfarm including all its Development Areas and associated infrastructure. |
| Vessel Monitoring System (VMS) | Connects offshore and onshore export cables at the landfall. The transition bay will be located above mean high water. |
| WDA Infrastructure | The offshore generation and transmission infrastructure located within the WDA including but not limited to: WTGs, WTG fixed foundations (and associated scour protection), OSP(s), OSP fixed foundations (and associated scour protection), IACs, OSP link and offshore export cable(s) and their associated external cable protection (insofar as these are located within the WDA) and fibre optic cables. |
| Wind Turbine Generator (WTG) | A wind turbine generator which converts wind energy into electrical energy. Each wind turbine generator is a complex system composed of a high number of components. Typically, the main components include the rotor assembly (composed of three blades and a hub); the nacelle (containing a generator, shaft and gearbox, power electronic converter and transformer); and the tower (containing lifting equipment and the switchgear). |

| Term | Definition |
|---|---|
| Windfarm Development Area (WDA) | The application boundary within the OAA where consent will be sought for the proposed WDA infrastructure. The WDA infrastructure is subject to Section 36 consent and marine licence applications (generation and transmission) which are being applied for separately from the Offshore ECC infrastructure and OnTDA infrastructure. |

# 21 MAJOR ACCIDENTS AND DISASTERS

## 21.1 INTRODUCTION

1. This chapter presents an assessment of potential impacts and likely significant effects (LSE) on Major Accidents and Disasters that may arise from the construction, operation and maintenance (O&M), and decommissioning of the MachairWind Windfarm Development Area (WDA) infrastructure.

2. The structure of the Major Accidents and Disasters chapter deviates from the structure of other Environmental Impact Assessment (EIA) Report (EIAR) chapters, defined within **Chapter 5 Methodology**. The assessment for LSE has been guided by the Institute of Environmental Management and Assessment (IEMA) 'Major Accidents and Disasters in EIA: A Primer' guidance (IEMA, 2020)[1], and compliance with the Marine Guidance Note 654 Marine Accident Investigation Branch (MAIB, 2012). Key definitions used within this chapter (in accordance with the guidance detailed below:

   - 'Major accidents' are defined as 'events that threaten immediate or delayed serious environmental effects to human health, welfare and/ or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events.'
   - A 'disaster' is a sudden accident or natural catastrophe that causes great damage or loss of life. These can be natural or can be man-made hazards (e.g. caused by accidental loss of containment) or external hazards (e.g. act of terrorism) which result in consequences for people or the environment.
   - 'Significant environmental effect' is defined in this chapter as a major accident or disaster that could include loss of life, permanent injury, loss of Project infrastructure, loss of function of Project infrastructure and temporary or permanent destruction to the marine environment which cannot be restored through minor clean-up and restoration.
   - 'Marine casualty' is an event or sequence of events that occurred directly in connection with the operation of a ship, and resulted in;
     - The death of, or serious injury to a person;
     - The loss of a person from a ship;
     - The loss, presumed loss or abandonment of a ship;
     - Material damage to a ship.;
     - The ship being unfit to proceed, or requires flag state approval or a condition of class before it may proceed;
     - At sea, a breakdown of the ship, requiring towage;
     - The stranding or disabling of a ship, or the involvement of a ship in a collision;
     - Material damage to marine infrastructure external of a ship that could seriously endanger the safety of the ship, another ship or any individual; and
     - Pollution, caused by damage to a ship or ships.

3. A 'Marine incident' is defined as an event, or sequence of events, which occurred directly in connection with the operation of a ship, that do not meet the criteria to be classified as a marine casualty but that endangered or, if not corrected would endanger, the safety of the ship, its occupants or any other person or the environment. This chapter is also informed by the following EIAR chapters:

[1] It is noted that IEMA is now referred to as the *Institute of Sustainability and Environmental Professionals*, guidance has not yet been updated to reflect this change in name.

- **Chapter 7 Marine Physical Environment;**
- **Chapter 8 Benthic Ecology;**
- **Chapter 9 Fish (Including Basking Shark) and Shellfish;**
- **Chapter 10 Marine Mammals and Leatherback Turtle;**
- **Chapter 11 Offshore Ornithology;**
- **Chapter 12 Commercial Fisheries;**
- **Chapter 13 Shipping and Navigation;**
- **Chapter 15 Military and Civil Aviation;**
- **Chapter 17 Infrastructure and Other Marine Users;**
- **Chapter 18 Socio-economics;** and
- **Chapter 20 Climate Change Risk Assessment.**

4. This chapter has been prepared to provide the Marine Directorate Licensing and Operations Team (MD-LOT) (on behalf of the Scottish Ministers) and stakeholders with sufficient information to determine the likely significant effect(s) of the Project on the receiving environment.

5. This chapter was prepared by Haskoning.

### 21.1.1 Legislation, Policy and Guidance

6. The overarching policy and legislation relevant to the EIA is described in **Chapter 2 Policy and Legislative Context**. **Table 21.1** sets out the relevant legislation, policy and guidance that informs the assessment for Major Accidents and Disasters.

*Table 21.1 Summary of relevant legislation, policy and guidance for Major Accidents and Disasters*

| Relevant Policy or Guidance | Relevance to the Assessment |
|---|---|
| **Legislation** | |
| Health and Safety at Work Act 1974 | The Act defines the general duties of employers and employees for maintaining health and safety within most workplaces. It requires workplaces to provide adequate training of staff, adequate welfare provisions, a safe working environment and provision of relevant information and supervision. |
| The Management of Health and Safety at Work Regulations 1999 | The Regulations outline what employers must do to manage health and safety and apply this to work activities. The main duty of the employer is to produce risk assessments. |
| Construction (Design and Management) Regulations 2015 (Health and Safety Executive (HSE), 2015a) | The Regulations outline the actions required for the health, safety and welfare of construction projects to prevent injury and ill health, applying to all building and construction work. |
| Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015 (HSE, 2015b) | The Regulations apply to oil and gas operations in external waters and aims to reduce risks from major accident hazards and the health and safety of the workforce. |
| Control of Major Accident Hazards Regulations (HSE, 2015c) | These regulations aim to prevent and mitigate the effects of major accidents involving dangerous substances which can cause serious harm to people and/or the environment. |
| The Marine Works (Environmental Impact Assessment) Scotland Regulations 2017 | The Regulations require significant risks to the receiving communities and environment, for example through Major Accidents and Disasters, to be considered. Similarly, significant effects arising from the vulnerability of the Windfarm Development Area (WDA) to Major Accidents and Disasters should be considered. |
| The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 | The Regulations require consideration of Major Accidents and Disasters within this chapter of the EIAR. |
| **Policy** | |
| The Civil Contingencies Act 2004 and the Civil Contingencies Act 2004 (Contingency Planning) (Scotland) Regulations 2005 | The Civil Contingencies Act 2004 establishes a framework for civil protection, setting out roles and responsibilities on organisations who play a role in preparing for and responding to emergencies. |
| **Guidance** | |
| Institute of Environmental Management and Assessment (IEMA) Major Accidents and Disasters in EIA: A Primer 2020 | The primer provides assessment methodology based on up-to-date best practice within the UK. |
| The International Organisation of Standardisation 31000: 2009. Risk Management – principles and guidelines (ISO, 2009) | This provides principles and guidelines on risk management and can be applied to a range of activities and any type of risk. |
| Guidelines for Environmental Risk Assessment and Management Green Leaves III (Defra, 2011) | This provides guidelines for the assessment and management of environmental risks. |

| Relevant Policy or Guidance | Relevance to the Assessment |
|---|---|
| Offshore Major Accident Regulator Memorandum of Understanding between The Offshore Petroleum Regulator for Environment and Decommissioning and The Health and Safety Executive | This aims to promote high levels of protection from major accidents for people and the environment. |
| International Maritime Organization (IMO) (2018): Revised Guidelines for Formal Safety Assessment (FSA) for use in the IMO Rule-Making Process. | The guidelines aim to enhance maritime safety protecting, life, health and the marine environment. |
| Operational working agreement between Maritime and Coastguard Agency, HSE and Marine Accident Investigation Branch (MAIB) | This to ensure clarity and consistency by establishing the principles used to decide which organisation will take the lead on health and safety enforcement or accident investigation. |

## 21.2 CONSULTATION

7. This Major Accidents and Disasters chapter has been informed by engagement with stakeholders, including those listed below:

- Argyll and Bute Council;
- MD-LOT; and
- Marine Directorate Science Evidence, Data and Digital (MD-SEDD).

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

9. The consultation outcomes in relation to Major Accidents and Disasters are outlined in **Table 21.2**, which summarises stakeholder feedback, outlines how the Applicant has responded to the feedback received, and details how it has been considered within this chapter.

10. In addition to the engagement outlined in **Table 21.2**, the points of agreement between the Applicant and Argyll and Bute Council are listed below:

- The Applicant and Argyll and Bute Council agree on the legislation, guidance and policy used to inform the Major Accidents and Disasters assessment;
- The Applicant and Argyll and Bute Council agree on the mitigation measures selected;
- The Applicant and Argyll and Bute Council agree on the hazards and risks scoped into the assessment; and
- The Applicant and Argyll and Bute Council reached agreement on the proposed approach to setting out the major accidents and disasters in the WDA EIAR.

*Table 21.2 Summary of consultation relevant to Major Accidents and Disasters*

| I.D. | Consultee | Stakeholder Comment | Applicant Response |
|---|---|---|---|
| **Scoping Responses (09 January 2025)** | | | |
| 1. | Argyll and Bute Council | Argyll and Bute Council commented that the legislation, guidance and policy to inform the assessment are adequate. | The Applicant welcomes the agreement with regard to the legislation, guidance and policy that inform the assessment. |
| 2. | Argyll and Bute Council | Argyll and Bute Council agreed with the proposed embedded mitigation measures described during scoping. | The Applicant welcomes the agreement with regards to the mitigation measures described during scoping. |
| 3. | Argyll and Bute Council | Argyll and Bute Council confirmed all potential impacts on Major Accidents and Disasters were identified during scoping. They advise that that the Applicant consult with the MCA, and the NLB, if they have not already done so. | The Applicant has consulted with the Maritime and Coastguard Agency (MCA) and the Northern Lighthouse Board (NLB). See **Chapter 13 Shipping and Navigation** for further details regarding consultation undertaken with the MCA / NLB. |
| 4. | Argyll and Bute Council | Argyll and Bute Council agree with the hazards and risks that have been scoped in and out for further assessment. | The Applicant welcomes the agreement with regards to the hazards and risks scoped in and out. |
| 5. | Argyll and Bute Council | Argyll and Bute Council agree with the proposed approach to setting out the Major Accidents and Disasters in the WDA EIAR. | The Applicant welcomes the agreement with regards the proposed approach. |
| 6. | MD-LOT | The EIA Report must include a description and assessment of the likely significant effects deriving from the vulnerability of the Proposed Development to Major Accidents and Disasters. The Developer should make use of appropriate guidance, including the recent Institute of Environmental Management and Assessment ("IEMA") 'Major Accidents and Disasters in EIA: A Primer', to better understand the likelihood of an occurrence and the Proposed Development susceptibility to potential major accidents and hazards. The description and assessment should consider the vulnerability of the Proposed Development to a potential accident or disaster and also the Proposed Development potential to cause an accident or disaster. | Noted. The IEMA Primer informs the methodology of the Major Accidents and Disasters assessment as detailed in the approach to assessment (**Section 21.7)**. |

| I.D. | Consultee | Stakeholder Comment | Applicant Response |
|---|---|---|---|
| 7. | MD-LOT | The Scottish Ministers advise that existing sources of risk assessment or other relevant studies should be used to establish the baseline rather than collecting survey data and note the IEMA Primer provides further advice on this. This should include the review of the identified hazards from the baseline assessment, the level of risk attributed to the identified hazards and the relevant receptors to be considered. | Noted. Existing sources of risk assessment and other relevant studies have been used to establish the existing baseline, detailed in **Section 21.5.1**. |
| 8. | MD-LOT | The assessment must detail how significance has been defined and detail the inclusions and exclusions within the assessment. Any mitigation measures that will be employed to prevent, reduce or control significant effects should be included in the EIA Report. | Noted. Significance is defined in **Section 21.6,** aligned with the IEMA (2020) guidance. Appropriate mitigation has been outlined in **Section 21.6**. |

## 21.3 SITE-SPECIFIC SURVEY DATA

11. It is considered that no additional baseline information needs to be collected to inform this chapter, as there are sufficient existing data sources available to provide an environmental baseline to inform the assessment.

## 21.4 MAJOR ACCIDENTS AND DISASTERS STUDY AREA

12. The Study Area for the individual hazards has been determined in relation to the impact pathways, the distances to the receptors or from examination of the scale of impacts from examples of historic incidents where available. The geographic scope may reach beyond the WDA where there is potential for interaction. Professional judgement has informed the scope relating to the hazards with the potential for interaction with the Project.

13. The temporal scope relates to the lifespan of the Project, through construction, O&M, and decommissioning.

## 21.5 EXISTING ENVIRONMENT

### 21.5.1 Existing Baseline

14. The existing baseline has been characterised in the chapters listed in **Section 21.1**, with each topic considering its own future baseline in relation to several factors throughout the lifecycle of the WDA.

15. There are likely to be advances in technology over the lifecycle of the WDA, with potential for further reductions in risks to safety and the environment, or to introduce new hazards with the introduction of novel technology. However, novel technologies would be implemented following appropriate risk assessment processes. This assessment is based on the design as set out in **Chapter 3 Project Description**. No data limitations were identified in the production of this assessment.

### 21.5.2 Potential Receptors

16. Major Accidents and Disasters are those with the potential to have serious consequences for the receptors affected. A ‘receptor’ refers to the specific component of the environment that could be adversely affected if the source reaches it. The thresholds of what constitutes a major accident or disaster varies by receptor, the definitions for which are provided in **Table 21.3**.

17. The level of harm considered to represent a major accident or disaster is also presented. The thresholds for receptors to be considered under a major accident and disaster have been determined using industry good practice based upon criteria for notification of a major accident to the European Commission under Article 18(1) of Seveso III Directive and Regulation 26 of the COMAH Regulations 2015 (cited in IEMA, 2020) and DETR (1999).

*Table 21.3 Key receptors for Major Accidents and Disasters considerations in the WDA*

| Receptor | Receptor Justification | Major Accident Threshold |
|---|---|---|
| **WDA Infrastructure** | | |
| Wind Turbine Generators (WTGs) and associated fixed foundations and scour protection;<br>Offshore Substation Platforms (OSP) and associated fixed foundations and scour protection;<br>Inter-array cables (IACs) and associated cable protection;<br>OSP link cables and associated cable protection; and<br>The portion of the offshore export cables located within the WDA, and associated cable protection. | A major accident or disaster could adversely affect the WDA Infrastructure that is the subject of this EIAR. | Loss of resource and / or quality and integrity of receptor; severe damage to key characteristics, features or elements. For example, damage to asset resulting in permanent or long-term inoperability or complete loss of access to an economically important asset. |
| **Population and Human Health** | | |
| Construction workers, operations and maintenance workers, and other marine users. | Schedule 4 of Electricity Works (Environmental Impact Assessment) Scotland Regulations 2017 and Schedule 4 of the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 require the EIAR to consider the significant effects of a development on the environment, including effects on population and human health. | For the public and other marine users:<br>• Substantial number (five or more) of people requiring medical attention or any serious/life-changing injuries. Events of this magnitude may also involve some damage to housing, with low numbers of people being displaced. Potential for localised interruption to utilities and damage to infrastructure.<br>For workers:<br>• Multiple life changing injuries or fatalities. |

## 21.6 EMBEDDED MITIGATION

18. This section outlines the embedded mitigation relevant to the Major Accidents and Disasters assessment (as shown in **Table 21.4** below). Where additional mitigation measures are required to mitigate potentially significant effects (in EIA terms), these are detailed in the impact assessment.

*Table 21.4 Embedded mitigation measures for the Major Accidents and Disasters*

| ID | Parameter | Description of Mitigation Measure | Securing Mechanism |
|---|---|---|---|
| M-3 | Pollution from Ships | Compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 and adherence to the "OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic". | Section 36 and marine licence consent conditions. Secured via **Appendix 7 Marine Pollution Contingency Plan (MPCP)**.<br>Will be implemented as part of the standard operating procedures of contractors. |
| M-5 | Invasive Non-Native Management Plan | Development of, and adherence to, an Invasive Non-Native Species Mitigation Plan (INNSMP). This plan details mitigation measures to reduce the introduction and transfer of invasive non-native species. | Section 36 and marine licence consent conditions. Secured via **Appendix 8 INNSMP**. |
| M-8 | Cable Plan | Development of, and adherence to, a Cable Plan (incorporating a Cable Burial Risk Assessment (CBRA)). The Cable Plan will confirm planned cable routeing, burial, and any additional external cable protection, and will set out methods for post-installation cable monitoring. Furthermore, this plan will detail environmental sensitivities and design considerations to mitigate, as far as practicable, the effects of offshore cable laying and associated protection during installation and operation of the WDA infrastructure. The amount of cable protection utilised will be minimised where practicable; protection will be used only where design burial depths are not reasonably practicable or where crossings require it. | Section 36 and marine licence consent conditions. Secured via the requirement for a Cable Plan, to be developed and submitted to the Scottish Ministers for approval before commencement of construction. |
| M-9 | Invasive Non-Native Species | Adherence to the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) Convention (2004) which provides global regulations to control the transfer of potentially invasive species. | Section 36 and marine licence consent conditions. Secured via **Appendix 8 INNSMP**. |
| M-10 | Hierarchy of Unexploded Ordnance Clearance Methods | Development of an Unexploded Ordnance (UXO) Threat and Risk Assessment. The current hierarchy of UXO clearance techniques, in order of preference, are:<br>• Avoid (through micro-siting); | Will be secured via a UXO Threat Risk Assessment, which will be submitted as part of a separate Marine Licence application submission prior to construction. |

| ID | Parameter | Description of Mitigation Measure | Securing Mechanism |
|---|---|---|---|
| | | • Use a low-noise method to render the ordnance safe without requirement for detonation, e.g. laser cutting, mechanical removal if safe to do so;<br>• Low-order clearance if above options not practicable; and<br>• High-order clearance, if low-order clearance not possible, or in the unlikely event that low-order deflagration was unsuccessful. | |
| M-18 | Navigational Safety Plan | Development of, and adherence to, a Navigational Safety Plan (NSP). This plan will describe measures put in place related to navigational safety, including information on safety zones, charting, construction buoyage, temporary lighting and marking, and means of notification of activities associated with the WDA to other sea users. | Section 36 and marine licence consent conditions. Secured via **Appendix 13 Outline Vessel Management Plan and NSP**. |
| M-19 | Notice to Mariners | Advanced warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher webpage. All notices will be uploaded to the Project website (www.machairwind.com). | Included within NSP content which is a standard Section 36 and marine licence consent condition. An outline NSP has been provided in **Appendix 13 Outline Vessel Management Plan and NSP**. |
| M-20 | Lighting and Marking Plan (LMP) | This plan will set out the marine and aviation navigational lighting and marking measures to be applied during the construction and operation of the WDA. This will be in accordance with **Appendix 12 Outline Lighting and Marking Plan**. Aviation lighting and marking, as described in the LMP, will be installed in accordance with Article 223 of the United Kingdom (UK) Air Navigation Order 2016 which sets out the mandatory requirements to be followed for lighting of offshore WTGs. | Section 36 and marine licence consent conditions. An outline LMP has been provided in **Appendix 12 Outline LMP**. |
| M-23 | Safety Zones | Application for and use of Safety Zones of up to 500 m during construction, major repairs and decommissioning phases. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, O&M and | Application submitted under Section 95 and Schedule 16 of the Energy Act 2004. Will also be referenced within the NSP, secured under standard Section 36 and Marine Licence condition. |

| ID | Parameter | Description of Mitigation Measure | Securing Mechanism |
|---|---|---|---|
| | | decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards. During O&M, there would be 500 m safety zones around any structure where major maintenance is ongoing. | |
| M-24 | Dropped Objects | Dropped objects on the seabed during works associated with the WDA which may pose a hazard will be reported in line with Marine Directorate - Licensing Operations Team (MD-LOT) procedures. Objects will be recovered where they pose a hazard to other marine users and where recovery is possible. | Section 36 and marine licence consent conditions. Secured via **Appendix 13 Outline Vessel Management Plan and NSP**. |
| M-25 | Marking | All WDA Infrastructure will be appropriately marked on the United Kingdom Hydrographic Office Admiralty Charts. | Provision of relevant information to UKHO required under standard marine licence conditions. |
| M-26 | Search and Rescue | Development of a Search and Rescue (SAR) Checklist in consultation with the Maritime and Coastguard Agency to ensure compliance with Marine Guidance Note 654 and its annexes. This will be completed post consent. | Section 36 and marine licence consent conditions. Secured via **Appendix 13 Outline Vessel Management Plan and NSP**. |
| M-27 | Emergency Response and Cooperation Plan | Development of, and adherence to, an Emergency Response and Cooperation Plan (ERCoP). This plan ensures co-operation with the Maritime and Coastguard Agency (MCA) by detailing the design parameters of the WDA, emergency contact details, and processes to be followed. | Section 36 and marine licence consent conditions. Secured via an Emergency Response and Cooperation Plan which will be developed and submitted prior to construction. |
| M-28 | Guard Vessels | Where appropriate, guard vessels will be used to ensure adherence with Safety Zones (M-23) or advisory passing distances. | Section 36 and marine licence consent conditions. Secured via **Appendix 13 Outline Vessel Management Plan and NSP**. |
| M-29 | Marine Coordination Centre | Marine coordination centre will be implemented to manage project vessels throughout construction, Operation and Maintenance (O&M) and decommissioning. | Section 36 and marine licence consent conditions. Secured via **Appendix 13 Outline Vessel Management Plan and NSP**. |
| M-30 | Blade Tip Clearance / Air Gap | Blade tip clearance height / Air Gap of at least 28.40 m above Highest Astronomical Tide (HAT), noting this exceeds MGN 654 requirements. | Compliance with MGN 654 is a standard Section 36 and marine licence consent condition (typically captured under NSP condition) and secured under project design. |

| ID | Parameter | Description of Mitigation Measure | Securing Mechanism |
|---|---|---|---|
| M-31 | Vessel Marine Regulations | Compliance of all Project vessels with international Marine Regulations as adopted by the Flag State, notably Convention on International Regulations for Preventing Collisions at Sea (COLREGs) IMO, 1972/77) and International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974). | Section 36 and marine licence consent conditions. Secured via **Appendix 13 Outline Vessel Management Plan and NSP**. The Project will employ a dedicated competent resource to verify compliance with international Marine Regulations, including a Marine Operations Management Manual and a suite of Project documentation specific to Marine Operations. |
| M-33 | Aeronautical Navigational Marking | Appropriate marking of the WDA on aeronautical charts. This will include provision of the positions and heights of structures to the Civil Aviation Authority, Ministry of Defence and Defence Geographics Centre. | Section 36 and marine licence consent conditions. Secured via **Appendix 13 Outline Vessel Management Plan and NSP**. |
| M-34 | Development Specification and Layout Plan | Development of, and adherence to, a Development Specification and Layout Plan. The layout of the WTGs will be finalised post consent. Consultation with the MCA and Northern Lighthouse Board (NLB) will be undertaken to ensure that the specific WTG layout is compatible with potential SAR activity (M-26). | Section 36 and marine licence consent conditions. Secured via the requirement for a Design Specification and Layout Plan, which will be submitted to Scottish Ministers for approval prior to the commencement of construction. |
| M-35 | Failures of Lighting and Marking | Failures of the lighting and marking in the WDA will be appropriately reported and rectified as soon as practicable. Interim hazard warnings (i.e. Notice to Mariners (M-19)) or alternate temporary mitigation will be put in place as required. Associated communication procedures, including with the MCA and NLB will be included in the post-consent LMP (M-20). | Section 36 and marine licence consent conditions. Secured via **Appendix 12 Outline LMP**. |
| M-36 | Site Navigation Marking | Marking and lighting of the site following consultation with NLB and in line with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Guidance G1162 (IALA, 2021) including a buoyed construction area. | Section 36 and marine licence consent conditions. Secured via **Appendix 12 Outline LMP**. |
| M-46 | Decommissioning Programme | Development and adherence to a Decommissioning Programme. This programme will identify all the items of equipment, infrastructure and materials that have been installed or drilled and describes the decommissioning solution for each whilst considering the potential environmental effects of each | Section 36 and marine licence consent conditions. Secured via a Decommissioning Programme, which will be developed and submitted to Scottish Ministers for approval before commencement of construction. |

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

## 21.7 APPROACH TO ASSESSMENT

19. As noted above, this topic chapter considers the WDA Study Area and existing environment only. A combined assessment of the construction, O&M and decommissioning of the WDA activities, Offshore Export Cable Corridor (ECC) and Onshore Transmission Development Area (OnTDA) activities (commensurate with the level of detail that is available at the time of carrying out that assessment) is also provided and the methodology for this is described in **Section 21.7.2**. This approach ensures a holistic view is undertaken of the entire Project.

### 21.7.1 Windfarm Development Area-Alone

#### *21.1.1.1 Assessment Methodology*

20. Whilst there is no standard methodology for the assessment of Major Accidents and Disasters within EIA, IEMA have prepared 'Major Accidents and Disasters in EIA: A Primer' (IEMA, 2020) which provides guidance on a risk-based approach, which should focus on low likelihood but potentially high consequence events. This chapter has assessed the potential vulnerability of the Project to disaster risks, and the potential of the WDA to cause major accidents and disasters. The assessment has taken into account the mitigation embedded within the Project to ensure a risk is As Low As Reasonably Practicable (ALARP) (or avoided completely).

21. The following approach has been undertaken during the risk assessment (Steps 1 and 2 were undertaken in Section 20.9 of the Scoping Report). The methodology for the Major Accidents and Disasters assessment follows Steps 3 and 4:

- **Step 1**: Identify hazards in long lists of possible major accidents and events. Major accidents with little relevance to the WDA have not been included (e.g., volcanic eruptions). Sources have included the UK Government National Risk Register – 2020 edition and further relevant sources. This step has also involved the identification of the receptors in the existing environment.
- **Step 2**: Screening exercise to determine which risks are relevant to the WDA and require further assessment.
- **Step 3**: Risk assessment - definition of the potential impacts that may occur from the risks and classification of the likelihood that the events may occur. Identification and evaluation of prevention, minimisation and mitigation measures.
- **Step 4**: Determination of whether the risk has been mitigated to ALARP and the identification of any residual risk, and the consequences upon the receptors in the event of a major accident or disaster.

#### *21.7.1.1 Risk Assessment*

22. Major accidents and disasters, by definition, are those with the potential to have serious consequences for the receptors affected. The thresholds of what constitutes a major accident or disaster varies by receptor, and the definitions of the thresholds for the relevant receptors is provided in **Section 21.5.2**.

23. When determining whether a hazard constitutes a major accident or disaster, the likelihood of a serious event occurring is assessed. Hazards with both high consequences and a high likelihood of occurring are classified as high risk, meaning they are unacceptable for any development and must be avoided through design measures (an example may be infrastructure that did not comply with design codes causing a major failure).

24. The risk assessment therefore has focused largely on low likelihood, but potentially high consequence events. Events relating to a planned or known activity, such as noise and vibration from piling, are covered within relevant chapters of the EIAR, where assessment of the impacts and

mitigation is provided. This assessment has identified potential low likelihood, high consequence events with the potential to occur in the Project area that may be determined to constitute a major accident or disaster. It has also set out the Project's embedded mitigation, any required additional mitigation, and assessed whether impacts have been reduced to ALARP or avoided.

#### *21.7.1.2 Significance of Effect Definition*

25. As detailed in the IEMA 2020 guidance, a significant effect in the context of major accidents and disasters can be defined as 'anything that causes the loss of life or permanent injury, and/or permanent or long-lasting damage to an environmental receptor'. Under this definition, the WDA Infrastructure itself is considered an 'environmental receptor' due to its presence within the environment where a major accident and disaster may occur. This definition has been adopted for this chapter and is independent of the potential risk of that major accident or disaster occurring (i.e. a major accident or disaster could be considered significant even if the risk has been reduced to ALARP). Consequently, this methodology differs from the EIA approach outlined in **Chapter 5 Methodology**, which defines significant effects based on sensitivity and magnitude with a significance matrix, whereas in the context of major accidents or disasters the judgement of significance is binary and effects would either be significant or not.

### 21.7.2 Combined Assessment: Windfarm Development Area, Offshore ECC and Onshore Transmission Development Area Methodology

26. The combined assessment is based on a broad preliminary Offshore ECC that connects the WDA to a landfall location(s) near Girvan, South Ayrshire. Section 3.7 in Chapter 3 Project Description details indicative parameters relating to project components and associated construction methods and timelines which have informed the combined assessment. Offshore and onshore engineering and environmental surveys enabling Offshore ECC and OnTDA corridor refinement are anticipated to take place after the WDA EIAR has been submitted to the consenting authorities.

27. When it is time to bring forward the Offshore ECC and OnTDA consenting approaches, their respective scoping and EIARs will include the likely residual effects assessment outcomes of the WDA EIA.

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

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

30. Worst-case scenarios for all WDA Infrastructure (which includes OSPs, OSP link cables and up to 200 km of the offshore export cables which could be located within the WDA red line boundary) has been incorporated into the worst-case scenario for the WDA-alone assessment (**Section 21.8.4**).

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

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

33. **Section 21.8.5** includes a qualitative discussion where potential interactions and additive effects between the WDA and the Offshore ECC and OnTDA have been identified, with the aim of determining whether effects could result in those of greater significance than assessed for the WDA-alone assessment. To accompany the description, a combined assessment summary table is provided. Only residual effects from the WDA-alone assessment are taken forward for consideration in the combined assessment.

### 21.7.3 Cumulative Effects Assessment Methodology

34. The assessment presented in this chapter has, by its very nature, inherently accounted for interactions between the Project and other plans, projects and activities. The assessment approach for Major Accidents and Disasters, which considers the vulnerability of the Project to major accidents and disasters, does not assess potential cumulative effects on sensitive receptors, as a major accident and disaster event is a rare, isolated event, which does not have on-going impacts.

## 21.8 ASSESSMENT OF MAJOR ACCIDENTS AND DISASTERS

### 21.8.1 Step 1: Identification of Hazards

35. Hazards with the potential to cause significant effect were identified during scoping using the National Risk Register, professional judgement, and a review of available literature. In relation to shipping and navigation**,** a series of Hazard Workshops were held in summer 2025, with the following stakeholders in attendance (see **Chapter 13 Shipping and Navigation** for further information):

- MCA;
- Northern Lighthouse Board (NLB);
- UK Chamber of Shipping;
- Port of Glensanda;
- DFDS Seaways;
- CalMac Ferries;
- Royal Yachting Association Scotland;
- Scottish White Fish Producers Association;
- Clyde Fishermen's Association; and
- Local fishers.

### 21.8.2 Step 2: Screening

36. During scoping, a screening exercise was conducted to determine which hazards identified in the long list (**Section 21.8.1**) are relevant to the WDA Infrastructure and require further assessment. Table 20.4 of the Scoping Report provides a justification for the scoping in/ out of each hazard or potential major accident or disaster. Following the IEMA (2020) guidance, hazards have been scoped out of the assessment if meet the following criteria:

- The WDA is no more vulnerable to this type of hazard than any other development;
- The event would have negligible consequence on the WDA; and
- The hazard is unlikely to include loss of life, permanent injury, loss of project infrastructure and temporary or permanent destruction the marine environment i.e. the hazard would not result in a major accident or disaster.

37. **Table 21.5** lists the vulnerabilities of the WDA to the baseline anthropogenic sources of hazards which have potential for significant adverse effects. A justification is provided for scoping them into the assessment.

38. In addition to the existing baseline, the WDA will introduce additional pressures that may have the potential for accidents on the receiving environment, such hazards are listed in **Table 21.6.**

*Table 21.5 Scoping of vulnerability of the WDA Infrastructure to existing Major Accidents and Disasters*

| Hazard | Phase<br>Scoped in (✓) / out (x) | | | Justification | Receptors |
|---|---|---|---|---|---|
| | C | O&M | D | | |
| **Project Specific Hazards** | | | | | |
| Exposed cables leading to vessel snagging | ✓ | ✓ | ✘ | The potential for snagging risk from commercial fishing receptors in the WDA. The event could lead to immediate damage to WDA cabling infrastructure. | WDA Infrastructure |
| Vessel interactions (e.g. collision, allision) | ✓ | ✓ | ✓ | The risk of interaction between Project vessels and existing shipping and navigation receptors within the WDA. There is a risk of loss of life to Project personnel and damage to Project infrastructure. | WDA Infrastructure |
| Aviation collision | ✓ | ✓ | ✓ | Risk of collision with existing military and aviation receptors within the WDA. There is a risk of damage to Project infrastructure. | WDA Infrastructure |

*Table 21.6 Scoping of potential for the Project to cause Major Accidents and Disasters*

| Hazard | Phase Scoped in (✓) / out (x) | | | Justification | Receptors |
|---|---|---|---|---|---|
| | C | O&M | D | | |
| **Project Specific Hazards** | | | | | |
| Exposed cables leading to vessel snagging | ✓ | ✓ | ✗ | There is a risk of loss of life and damage to fishing vessels. The event could lead to immediate and likely irreparable damage to other marine users and the marine environment. | Population and human health, biodiversity, material assets. |
| Vessel interactions (e.g. collision, allision) | ✓ | ✓ | ✓ | There is a risk of loss of life and damage to other marine users from this hazard. | Population and human health, biodiversity, material assets |
| Aviation collision | ✓ | ✓ | ✓ | There is a risk of loss of life and damage to aviation receptors from this hazard. | Population and human health, biodiversity, material assets |
| Disturbance of Unexploded Ordnance (UXO) in Project area | ✓ | ✓ | ✓ | There is a risk of loss of life, other marine users and marine biodiversity from this hazard. | Population and human health, biodiversity, material assets |
| Workplace accident | ✓ | ✓ | ✓ | There is a risk of loss of life and damage to other marine users from this hazard. | Population and human health, biodiversity, material assets and land |
| **Major Accidents** | | | | | |
| Major fires | ✓ | ✓ | ✓ | Event could lead to serious damage to the environment through harmful emissions to air and sea and create a localised fire hazard, however the location of the WDA is away from populated areas which limits the scale of impact. | Population and human health, biodiversity, air quality and climate, material assets and land |

39. Hazards from the longlist presented in the Scoping Report and any additional hazards identified subsequently which are considered for further assessment are as follows:

- Vulnerability of the WDA Infrastructure to existing major accidents or disasters:
  - Exposed cables leading to vessel snagging;
  - Vessel interactions (e.g. collision, allision); and
  - Aviation collision.
- Potential for the Project to cause a major accident or disaster:
  - Exposed cables leading to vessel snagging;
  - Vessel interactions (e.g. collision, allision);
  - Aviation collision;
  - Disturbance of UXO in Project area;
  - Workplace accident; and
  - Fires.

40. It should be noted that following the submission of the Scoping Report, the potential for WDA Infrastructure to cause major fires was identified. This hazard has therefore been included in the assessment due to the potential for significant environmental effect.

41. Several of the hazards identified above are already considered in the relevant chapters of the EIAR. These relevant chapters (as listed below) are used to inform the assessment below to determine whether the risk has been mitigated to ALARP.

- **Chapter 8 Benthic Ecology**;
- **Chapter 13 Shipping and Navigation**;
- **Chapter 15 Military and Civil Aviation**;
- **Chapter 10 Marine Mammals and Leatherback Turtle**; and
- **Chapter 17 Infrastructure and Other Marine Users**

### 21.8.3 Step 3: Risk Assessment

42. This section outlines potential risk events that may arise from the baseline environment of the WDA, and as result of the construction, O&M and decommissioning of the WDA Infrastructure. Embedded mitigation has been considered for each identified hazard. The assessment determines whether effects may be significant and whether the risk has been reduced and managed to an acceptable level (ALARP).

43. This assessment has been undertaken on the basis of all embedded mitigation measures outlined in **Table 21.4**. The embedded mitigation measures relevant for each impact are listed in the summary **Table 21.8**.

#### *21.8.3.1 Vulnerability of the WDA Infrastructure to Existing Accidents/ Disasters*

21.8.3.1.1 Exposed Cables Leading to Vessel Snagging

44. WDA cabling infrastructure is vulnerable to vessel snagging which could result in damage to material assets and WDA infrastructure. The risk event is the possibility of fishing vessels operating within the WDA to sever cable connections and/or damage cables.

45. Commercial fishing operations take place within the WDA (as detailed in **Chapter 12 Commercial Fisheries**). However, there is limited overlap with demersal trawl and scallop trawl operations (which are more likely to cause snagging). Embedded mitigation includes a Cable Plan (CaP), as described in **Table 21.4**. The Project will employ cable burial techniques where feasible for IACs, OSP link

cables and the portion of the Offshore ECC located within the WDA. These measures will reduce the likelihood of snagging of exposed cables to extremely unlikely.

46. Due to the potential for damage to the WDA Infrastructure to occur and a resulting loss in function, there would be a **significant** effect should this hazard occur. **However, with the described design measures and mitigation, the potential for this hazard to occur is ALARP.**

21.8.3.1.2 Vessel Interactions (e.g. Collision, Allision)

47. Surface assets and vessels associated with the construction, O&M and decommissioning of the WDA Infrastructure are vulnerable to interactions with third-party vessels. Vessel interactions have the potential for serious consequences, including multiple serious injuries and/or fatality to the Project workforce and loss of WDA vessel / infrastructure critical to operations.

48. The Project's site selection process for the WDA has avoided significant interactions with existing marine infrastructure such as Dubh Artach lighthouse. This has been undertaken through a combination of consultation, desk-based research and offshore surveys. A further detailed analysis of this site selection process is provided in **Chapter 4 Site Selection and Assessment of Alternatives**. Detailed mitigation regarding potential vessel interactions is provided in **Appendix 13 Outline Vessel Management Plan and Navigational Safety Plan**, which will be developed further in the post-consent phase of the Project. These measures will reduce the likelihood of vessel interactions within the WDA to extremely unlikely.

49. Due to the potential for injury / fatalities to the Project's workforce resulting from vessel collision / allision, there would be a **significant** effect should this hazard occur. **However, with the described design measures and mitigation, the potential for this hazard to occur is ALARP.**

21.8.3.1.3 Aviation Collision

50. Aviation collision has the potential for serious consequences on surface-piercing WDA Infrastructure (WTGs, OSPs) critical to operations.

51. The risk of low flying aircraft colliding with offshore infrastructure or vessels associated with the Project is addressed in **Chapter 15 Military and Civil Aviation.** The likelihood of aviation collision is assessed as remote due to the implementation of embedded mitigation measures. Mitigation measures to avoid impacts on aviation receptors include:

- Mitigation during construction (including the development of and adherence to an LMP);
- Compliance with SAR requirements; and
- Use of aviation obstacle lighting.

52. These measures will reduce the likelihood of aviation collision to extremely unlikely.

53. Due to the potential for damage to WDA Infrastructure, resulting in a loss in function, there would be a **significant** effect should this hazard occur. **However, with the described design measures and mitigation, the potential for this hazard to occur is ALARP.**

### *21.8.3.2 Potential for the WDA Infrastructure to Cause Major Accidents and Disasters*

21.8.3.2.1 Exposed Cables Leading to Vessel Snagging

54. The snagging of commercial fishing vessels on WDA cabling infrastructure may result in disturbance and possible injury to fishers working on fishing vessels , in addition to the damage or loss of fishing equipment. Vessel snagging may also result in disturbance and possible injury to marine organisms.

55. The impacts, mitigation, and evaluation of the residual risk of this hazard on shipping and navigation and commercial fisheries receptor are discussed in Section 13.11.1.7 of **Chapter 13 Shipping and Navigation** and Section 12.11.1.5 of **Chapter 12 Commercial Fisheries**. Due to the potential for injury resulting from vessel snagging, there could be a **significant** effect should this hazard occur. However, the measures described in **Section 21.8.3.1.1** will ensure the continuation of fishing activities in areas where the cables are buried, and will reduce the likelihood of vessel snagging to extremely unlikely. Therefore, **the risk of a major accident or disaster associated with vessel snagging is ALARP**.

21.8.3.2.2 Vessel Interaction

56. There is potential for the construction, O&M and decommissioning of the WDA infrastructure to have a significant effect on shipping and navigation receptors. Interactions between third-party vessels and WDA Infrastructure and vessels may result in multiple serious injuries and/or fatality, and/or vessel damage, with potential release of fuel / cargo into the marine environment. Vessel interactions may also result in disturbance and possible injury to marine organisms.

57. Vessel to vessel collision risks with other marine users is addressed within Section 13.11.1.2 of **Chapter 13 Shipping and Navigation**. As discussed in the chapter, the likelihood of vessel-to-vessel collision involving Project and third-party vessels in the UK is extremely low.

58. The impacts, mitigation and evaluation of the residual risk for this hazard are discussed in **Chapter 13 Shipping and Navigation**, as well as **Chapter 17 Infrastructure and Other Marine Users** of the EIAR. Section 17.11 of **Chapter 17** also examines the risks associated with increased vessel movement to and from the WDA during construction, O&M and decommissioning.

59. Due to the potential for injury / fatalities resulting from vessel collision / allision, there would be a **significant** effect should this hazard occur. **However, the measures described in Section 21.8.3.1.2 will ensure the risk of a major accident or disaster associated with vessel interaction is ALARP.**

21.8.3.2.3 Aviation Collision

60. There is potential for the construction, O&M and decommissioning of the WDA infrastructure to have significant effect on military and aviation receptors. As assessed in **Chapter 15 Military and Civil Aviation,** interactions between low flying aircraft and WDA Infrastructure and vessels may result in multiple serious injuries and/or fatality, and potential release of fuel/ cargo into the marine environment.

61. Due to the potential for injury / fatalities resulting from aviation collision, there would be a **significant** effect should this hazard occur. **The measures described in Section 21.8.5.1.3 will ensure the risk of a major accident or disaster associated with aviation interactions is ALARP.**

21.8.3.2.4 Disturbance of UXO

62. There is potential for the construction, O&M and decommissioning of the WDA Infrastructure to disturb UXO. The accidental detonation of UXO has the potential to have serious consequences, including multiple serious injuries and/or fatality and possible injury to marine organisms, including marine mammals, fish and shellfish and benthic ecology.

63. Prior to construction, the Project will undertake surveys to identify any potential hazards within the WDA. These may include geophysical surveys to identify seabed hazards such as discarded fishing gear or unidentified objects and magnetometer surveys to identify potential UXO. Further information

on the intended pre-construction campaigns is outlined in **Chapter 3 Project Description**. Pre-construction surveys reduce the likelihood of accidental detonation of UXO to extremely unlikely.

64. This hazard and its impacts, including underwater noise, effects, and mitigation, are detailed in **Chapter 9 Fish (including Basking Shark) and Shellfish** and **Chapter 10 Marine Mammals and Leatherback Turtle**. As noted in these chapters and **Table 21.4** above, a UXO Threat and Risk Assessment will be developed post-consent. Due to the potential for injury / fatalities to occur resulting from disturbance of UXO, there would be a **significant** effect should this hazard occur. **However, the pre-construction surveys detailed above will ensure the risk of a major accident or disaster associated with UXO disturbance is ALARP.**

21.8.3.2.5 Workplace Accidents

65. There is potential for the construction, O&M and decommissioning of the WDA to cause workplace accidents which may have serious consequences, including multiple serious injuries and/or fatalities and damage to other marine users. The likelihood of workplace accidents occurring is remote due to existing health and safety protocols.

66. Accidents which may lead to major accidents and disasters will be avoided by means of training of personnel and ensuring that all personnel have all required qualifications, that qualifications are maintained, and that regular Project-specific information (e.g. toolbox talks) is promulgated to staff. All equipment, plant and vessels will be fit for purpose and maintained as required. In addition to training, all necessary requirements for dealing with accidents (first aid equipment, firefighting equipment) would be in place to deal with workplace accidents/incidents. These measures will reduce the likelihood of workplace accidents to extremely unlikely.

67. Due to the potential for injury / fatalities to occur resulting from workplace accidents, there would be a **significant** effect should this hazard occur. **However, through the implementation of the above mitigation measures the risk is ALARP.**

21.8.3.2.6 Fires

68. Substation fires can impact the supply of electricity and create a localised fire hazard, resulting in injury / fatalities to any workers present on the substation at the time. Fires may also have an adverse impact on biodiversity through a reduction of water and air quality,

69. The highest appropriate levels of fire protection and resilience will be utilised for the substation to minimise fire risks to ALARP. The small quantities of lubricants, fuel and cleaning equipment required for the Project will be stored in suitable facilities designed to the relevant regulations and policy design guidance. ERCoP will be developed following discussions with the MCA, including risk assessments and designated evacuation plans for workers on board in unlikely event of fire breaking out. These measures will reduce the likelihood of substation fires to extremely unlikely.

70. Due to the potential for injury / fatalities to occur resulting from substation fires, there would be a **significant** effect should this hazard occur. However, given the Project's offshore location limiting access to the public, and preventing fires from spreading, **including mitigation the risk of the consequences meeting the threshold for the applicable receptors is ALARP**.

### 21.8.4 Step 4: Residual Risk Assessment

71. At this stage, embedded mitigation measures are sufficient to ensure that risks from the identified hazards of relevance to the Project are sufficient to reduce risks to ALARP.

72. The mitigation measures outlined in **Section 21.6** are embedded into the construction, O&M, and decommissioning phases of the Project, and alongside use of industry safety standards, will act to minimise the impacts on the relevant receptors identified during Step 3 of the assessment. With a commitment to the highest health and safety standards in design and working practices enacted, none of the anticipated construction works or operational procedures are expected to experience an appreciable risk from major accidents or disasters.

### 21.8.5 Combined Assessment: Windfarm Development Area, Offshore ECC and Onshore Transmission Development Area

73. This section assesses interactions between the WDA, Offshore ECC and OnTDA (i.e. considering impact interactions and additive effects to determine if any effects would be materially elevated from those assessed for the WDA-alone assessment). This is referred to as the combined assessment.

#### *21.8.5.1 Vulnerability of the WDA Infrastructure to Existing Accidents/ Disasters*

21.8.5.1.1 Hazard 1: Exposed Cables Leading to Vessel Snagging

74. The Offshore ECC is potentially vulnerable to becoming exposed, leading to vessel snagging on cabling infrastructure. As noted within the scoping of potential hazards within the WDA (See **Section 21.8.3.1**), it is expected that the embedded mitigation measures outlined in **Section 21.6** would be sufficient to ensure no cable snagging occurs due to the installation of Offshore ECC infrastructure. Therefore, while there would be a **significant** effect should this hazard occur, the risk is considered ALARP.

75. The OnTDA is not located within any areas utilised by vessels. As such, no pathway for effect exists.

21.8.5.1.2 Hazard 2: Vessel Interactions (e.g. Collision, Allision)

76. During the construction, O&M and decommissioning phases of the Offshore ECC, vessel traffic will increase. However, the increase in vessel traffic associated with the Project is expected to be temporary, proceeding linearly along the Offshore ECC, with safety zones maintained around all vessels in operation. The embedded mitigation measures outlined in **Section 21.6** would be implemented for any works in the Offshore ECC to ensure any construction / decommissioning activities would be communicated to other marine users in a timely fashion to avoid vessel interactions with Offshore ECC-associated vessels and infrastructure. Therefore, while there would be a **significant** effect should this hazard occur, the risk is considered ALARP.

77. The OnTDA is not located within any areas utilised by vessels. As such, no pathway for effects exists.

21.8.5.1.3 Hazard 3: Aviation Collision

78. During construction of the Offshore ECC, any construction vessels with helidecks could create an aviation obstacle. However, any such vessels would be equipped with aviation lights on any high structures such as cranes or derricks. These items would be checked during the vessel inspection prior to the vessel being accepted on to the Project. As such, there would be no impact pathway from aviation receptors. In addition, the mitigation measures specified in **Section 21.6** will be applied consistently to all works within the WDA and Offshore ECC, ensuring that this risk is managed to be **ALARP**.

79. No pathway for effect exists between aviation collision and activities related to the OnTDA.

### *21.8.5.2 Potential for the WDA Infrastructure to Cause a Major Accident or Disaster*

21.8.5.2.1 Hazard 1: Exposed Cables Leading to Vessel Snagging

80. Offshore ECC infrastructure has the potential to cause a significant effect on commercial fishing vessels via gear snagging. To mitigate risk events to ALARP the Project will seek cable crossing agreements with existing cable operators where necessary and will comply with all industry standards for cable burial. Cable protection will be monitored according to the recommendations of cable suppliers and in agreement with power purchase customers. Therefore, while there would be a **significant** effect should this hazard occur, the risk is considered **ALARP**.

81. The OnTDA is not located within any areas utilised by vessels. As such, no pathway for effect exists.

21.8.5.2.2 Hazard 2: Vessel Interactions (e.g. Collision, Allision)

82. Offshore ECC infrastructure has the potential to cause significant effects on third-party vessels as a result of collision or allision. As described in **Section 21.8.3.1.2** the embedded mitigation developed for Offshore ECC works will ensure the risk of major accidents or disasters is ALARP. Therefore, while there would be a **significant** effect should this hazard occur, the risk is considered **ALARP**.

83. The OnTDA is not located within any areas utilised by vessels. As such, no pathway for effect exists.

21.8.5.2.3 Hazard 3: Aviation Collision

84. During construction of the Offshore ECC, any construction vessels with helidecks could create an aviation obstacle. However, any such vessels would be equipped with aviation lights on any high structures such as cranes or derricks. These items would be checked during the vessel inspection prior to the vessel being accepted on to the Project. As such, there would be no impact pathway from aviation receptors.

85. As described in Section 15.11.2 of **Chapter 15 Military and Civil Aviation**, the location of the OnTDA is laterally separated from any protected surfaces associated with Instrument Flight Procedures (IFPs) at Islay Airport and Tiree Airport. Plant equipment used during construction will not have an elevation profile sufficient to have an impact on aviation receptors. Therefore, while there would be a **significant** effect should this hazard occur, the risk is considered **ALARP**.

86. The OnTDA is not located within any areas utilised by aviation. As such, no pathway for effect is expected to exist between aviation collision and activities related to the OnTDA.

21.8.5.2.4 Hazard 4: Disturbance of UXO

87. During the construction, maintenance and decommissioning of Offshore ECC infrastructure there is the potential risk of UXO disturbance. The mitigation measures specified in **Section 21.6** will be applied alongside standard UXO best practice and control measures to all works within the WDA and Offshore ECC to ensure that this risk is managed to be ALARP. Therefore, while there would be a **significant** effect should this hazard occur, the risk is considered **ALARP**.

21.8.5.2.5 Hazard 5: Workplace Accidents

88. There exists the potential for offshore construction activities within the WDA and that of the Offshore ECC and OnTDA to occur simultaneously, therefore resulting in the risk of interaction or escalation of effects from construction activities resulting in workplace accidents and a significant effect occurring. However, through the implementation of the embedded mitigation measures described previously in **Section 21.8.3.2.5** across all elements of the Project, while there would be a **significant** effect should this hazard occur, the risk is considered **ALARP**.

21.8.5.2.6 Hazard 6: Major Fires

89. There is potential for the Offshore ECC and OnTDA infrastructure to cause fires at all stages of the Project. The embedded mitigation described in **Section 21.8.1** and fire protection measures will be consistently upheld across all Project elements. Therefore, while there would be a **significant** effect should this hazard occur, the risk is considered **ALARP**.

### 21.8.6 Combined Assessment Summary

90. Across all hazards, the risk of major accidents and disasters are minimised by the ability to adapt through design and embedded mitigation. When considered individually and in combination, the residual effects remain significant due to the severity of the consequence, but the likelihood of any major accidents or disasters occurring after implementation of embedded mitigation is very low, and all risks are considered to be ALARP. A summary of the combined assessment is detailed in **Table 21.7** below.

*Table 21.7 Major Accidents and Disasters combined assessment summary*

| Receptor/Topic | Risk of Major Accident or Disaster After Mitigation | Offshore ECC Assessment of Effects | OnTDA Assessment of Effects | Combined Assessment |
|---|---|---|---|---|
| **Vulnerability of WDA Infrastructure to Existing Accidents or Disasters** | | | | |
| C, O&M, D* Hazard 1: Exposed cables leading to vessel snagging | ALARP | ALARP | N/A – no pathway to receptors. | Significant effect if hazard occurs, however likelihood of residual risk ALARP |
| C, O&M, D* Hazard 2: Vessel interactions | ALARP | ALARP | N/A – no pathway to receptors. | Significant effect if hazard occurs, however likelihood of residual risk ALARP |
| C, O&M, D* Hazard 3: Aviation collision | ALARP | N/A- no pathway to receptors. | N/A – no pathway to receptors. | N/A - no potential for significant effect |
| **Potential for the WDA Infrastructure to cause Major Accidents or Disasters** | | | | |
| C, O&M, D* Hazard 1: Exposed cables leading to vessel snagging | ALARP | ALARP | N/A – no pathway to receptors. | Significant effect if hazard occurs, however likelihood of residual risk ALARP |
| C, O&M, D* Hazard 2: Vessel interactions | ALARP | ALARP | N/A – no pathway to receptors. | Significant effect if hazard occurs, however likelihood of residual risk ALARP |
| C, O&M, D* Hazard 3: Aviation collision | ALARP | N/A – no pathway to receptors | N/A – no pathway to receptors. | N/A – no potential for significant effect |
| C, O&M, D* Hazard 4: Disturbance of UXO | ALARP | ALARP | N/A – no pathway to receptors. | Significant effect if hazard occurs, however likelihood of residual risk ALARP |
| C, O&M, D* Hazard 5: Workplace accidents | ALARP | ALARP | Tolerable with mitigation | Significant effect if hazard occurs, however likelihood of residual risk ALARP Likelihood of residual risk ALARP |
| * C = Construction, O&M = Operation and Maintenance, D = Decommissioning | | | | |

## 21.9 TRANSBOUNDARY EFFECTS

91. No potential for significant transboundary effects from the WDA on Major Accidents and Disasters receptors within the Exclusive Economic Zone of other European Economic Area (EEA) member states or other interests of EEA member states have been identified. Therefore, transboundary effects have been scoped out of the EIAR, in line with the Scoping Opinion (MD-LOT, 2025).

## 21.10 INTER-RELATED AND INTERACTING IMPACTS

### 21.10.1 Inter-Relationships

92. The assessment of Major Accidents and Disasters examines how the WDA's impacts affect nearby receptors and is inherently interconnected. As a result, no additional inter-relationships with other environmental effects are identified in this context.

## 21.11 SUMMARY

93. **Table 21.8** presents a summary of the assessment of potential effects of Major Accidents and Disasters during the construction, O&M and decommissioning phases of the Project.

94. Consideration of the significant effects for potential Major Accidents and Disasters has been carried out following available guidance and legislation. The residual risk for hazards scoped in for further assessment is considered to be **ALARP**.

*Table 21.8 Summary of potential effects of major accidents and disasters*

| Hazard | Receptor(s) | EIA Chapter(s) / Document Addressing this Risk | Embedded Mitigation | Residual Risk | Proposed Monitoring | Combined Assessment |
|---|---|---|---|---|---|---|
| **Vulnerability of WDA Infrastructure to Existing Accidents or Disasters** | | | | | | |
| Exposed cables leading to vessel snagging | WDA Infrastructure | N/A | M-8 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |
| Vessel interactions (e.g. collision, allision) | WDA Infrastructure | N/A | M-18, M-19, M-20, M-23, M-28, M-29 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |
| Aviation collision | WDA Infrastructure | N/A | M-26, M-20, M-30, M-33, M-49 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |
| **Potential for the WDA Infrastructure to cause Major Accidents and Disasters** | | | | | | |
| Exposed cables leading to vessel snagging | Population and human health, biodiversity, material assets. | **Chapter 12 Commercial Fisheries**<br>**Chapter 13 Shipping and Navigation** | M-8 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |
| Vessel interactions (e.g. collision, allision) | Population and human health, biodiversity, material assets. | **Chapter 13 Shipping and Navigation**<br>**Chapter 17 Infrastructure and Other Marine Users** | M-18, M-19, M-20, M-23, M-28, M-29 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |
| Aviation collision | Population and human health, biodiversity, material assets. | **Chapter 15 Military and Aviation** | M-26, M-20, M-30, M-33, M-49 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |
| Disturbance of Unexploded Ordnance (UXO) in Project area | Population and human health, biodiversity, material assets. | **Chapter 9 Fish (including Basking Shark) and Shellfish**<br>**Chapter 10 Marine Mammals and Leatherback Turtle** | M-11 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |
| Workplace accident | Population and human health | N/A | M-47 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |
| Major Fires | Population and human health, biodiversity | **Appendix 6 Outline EMP** | M-4 | Significant effect should the hazard occur, but risk ALARP due to embedded mitigation measures. | N/A | Likelihood of residual risk ALARP |

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