

Cenos Offshore Windfarm Limited



# Cenos EIA

## Chapter 21 – Major Accidents and Disasters

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## ACRONYMS

ACRONYM	DEFINITION
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
BBC	British Broadcasting Corporation
BEIS	Department for Business, Energy, & Industrial Strategy
BGS	British Geological Survey
CAA	Civil Aviation Authority
CaP	Cable Plan
CBRA	Cable Burial Risk Assessment
CDM	The Construction (Design and Management) Regulations 2015
CES	Crown Estate Scotland
CMS	Construction Method Statement
CNS	Central North Sea
COMAH	Control of Major Accident Hazards
COSHH	Control of Substances Hazardous to Health
cUXO	Confirmed Unexploded Ordnance
DC	Direct Current
DGC	Defence Geographic Centre
DMP	Design Management Plan
DoL	Depth of Lowering
DSLPL	Development Specification and Layout Plan
ECA	Emission Control Area
EEA	European Economic Area
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIC	Export/Import Cable
EICB	Export/Import Cable Bundle
EICC	Export/Import Cable Corridor

ACRONYM	DEFINITION
EMP	Environmental Management Plan
ERCoP	Emergency Response Cooperation Plan
EU	European Union
FLO	Fisheries Liaison Officer
FMMS	Fisheries Management and Mitigation Strategy
FPSO	Floating Production Storage and Offloading
FSA	Formal Safety Assessment
FTU	Floating Turbine Unit
FV	Fishing Vessel
GEN	General Policy
GPS	Global Positioning System
HAZOP	Hazard Identification and Hazard & Operability
HDD	Horizontal Directional Drilling
HIRA	Hazard Identification Risk Assessment
HRA	Habitats Regulations Appraisal
HSE	Health and Safety Executive
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IEMA	Institute of Environmental Management and Assessment
IAC	Inter-Array Cable
IMO	International Maritime Organization
INNS	Invasive Non-Native Species
INNSMP	Invasive Non-Native Species Management Plan
INTOG	Innovation and Targeted Oil & Gas
km	Kilometre
LMP	Lighting and Marking Plan
M	Metre
MAH	Major Accident Hazard
MAIB	Marine Accident Investigation Branch

ACRONYM	DEFINITION
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate - Licensing Operations Team
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MLA	Marine Licence Application
MMO	Marine Mammal Observer
MoD	Ministry of Defence
MPA	Marine Protected Area
MPCP	Marine Pollution Contingency Plan
MW	Megawatt
NCMPA	Nature Conservation Marine Protected Area
NIS	Network and Information System
NLB	Northern Lighthouse Board
NMP	National Marine Plan
NOTAM	Notice to Airmen
NO <sub>x</sub>	Nitrogen Oxides
NSP	Navigational Safety Plan
OEM	Original Equipment Manufacturer
OFLOs	Offshore Fisheries Liaison Officers
OMAR	Offshore Major Accident Regulator
OSCP	Offshore Substation Converter Platform
OSPAR	Oslo-Paris Convention
PAM	Passive Acoustic Monitoring
PM	Particulate Matter
PS	Piling Strategy
PUQ	Production / Utilities / Quarters
pUXO	Potential Unexploded Ordnance
RLB	Red Line Boundary

ACRONYM	DEFINITION
ROV	Remotely Operated Vehicle
SAR	Search and Rescue
SCADA	Supervisory Control and Data Acquisition
SOPEP	Shipboard Oil Pollution Emergency Plans
SO <sub>x</sub>	Sulphur Oxides
TPV	Third Party Verification
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
VMP	Vessel Management Plan
WTG	Wind Turbine Generator

## GLOSSARY

TERM	DEFINITION
<b>2023 Scoping Opinion</b>	Scoping Opinion received in June 2023, superseded by the 2024 Scoping Opinion.
<b>2023 Scoping Report</b>	Environmental Impact Assessment (EIA) Scoping Report submitted in 2023, superseded by the 2024 Scoping Report.
<b>2024 Scoping Opinion</b>	Scoping Opinion received in September 2024, superseding the 2023 Scoping Opinion.
<b>2024 Scoping Report</b>	EIA Scoping Report submitted in April 2024, superseding the 2023 Scoping Report.
<b>Area of Opportunity</b>	The area in which the limits of electricity transmission via High Voltage Alternating Current (HVAC) cables can reach oil and gas assets for decarbonisation. This area is based on assets within a 100 kilometre (km) radius of the Array Area.
<b>Array Area</b>	The area within which the Wind Turbine Generators (WTGs), floating substructures, moorings and anchors, Offshore Substation Converter Platforms (OSCPs) and Inter-Array Cables (IAC) will be present.
<b>Cenos Offshore Windfarm ('the Project')</b>	'The Project' is the term used to describe Cenos Offshore Windfarm. The Project is a floating offshore windfarm located in the North Sea, with a generating capacity of up to 1,350 Megawatts (MW). The Project which defines the Red Line Boundary (RLB) for the Section 36 Consent and Marine Licence Applications (MLA), includes all offshore components seaward of Mean High Water Springs (MHWS) (WTGs, OSCP, cables, floating substructures moorings and anchors and all other associated infrastructure). The Project is the focus of this Environmental Impact Assessment Report (EIAR).
<b>Cenos Offshore Windfarm Ltd. (The Applicant)</b>	The Applicant for the Section 36 Consent and associated Marine Licences.
<b>Cumulative Assessment</b>	The consideration of potential impacts that could occur cumulatively with other relevant projects, plans, and activities that could result in a cumulative effect on receptors.



TERM	DEFINITION
<b>Developer</b>	Cenos Offshore Windfarm Ltd., a Joint Venture between Flotation Energy and Vårgrønn As (Vårgrønn).
<b>Environmental Impact Assessment (EIA)</b>	The statutory process of evaluating the likely significant environmental effects of a proposed project or development. Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and maintenance and decommissioning.
<b>Environmental Impact Assessment Regulations</b>	This term is used to refer to the Environmental Impact Assessment Regulations which are of relevance to the Project. This includes the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended); and the Marine Works (Environmental Impact Assessment) Regulations 2007.
<b>Environmental Impact Assessment Report</b>	A report documenting the findings of the EIA for the Project in accordance with relevant EIA Regulations.
<b>Export/Import Cable</b>	High voltage cable used to export/import power between the OSCPs and Landfall.
<b>Export/Import Cable Bundle (EICB)</b>	Comprising two Export/Import Cables and one fibre-optic cable bundled in a single trench.
<b>Export/Import Cable Corridor (EICC)</b>	The area within which the Export/Import Cable Route will be planned and the Export/Import Cable will be laid, from the perimeter of the Array Area to MHWS.
<b>Export/Import Cable Route</b>	The area within the Export/Import Export Corridor (EICC) within which the Export/Import Cable Bundle (EICB) is laid, from the perimeter of the Array Area to MHWS.
<b>Floating Turbine Unit (FTU)</b>	The equipment associated with electricity generation comprising the WTG, the floating substructure which supports the WTG, mooring system and the dynamic section of the IAC.
<b>Flotation Energy</b>	Joint venture partner in Cenos Offshore Windfarm Ltd.

TERM	DEFINITION
<b>Habitats Regulations</b>	The Habitats Directive (Directive 92/43/ECC) and the Wild Birds Directive (Directive 2009/147/EC) were transposed into Scottish Law by the Conservation (Natural Habitats &c) Regulations 1994 ('Habitats Regulations') (up to 12 NM); by the Conservation of Offshore Marine Habitats and Species Regulations 2017 ('Offshore Marine Regulations') (beyond 12 NM); the Conservation of Habitats and Species Regulations 2017 (of relevance to consents under Section 36 of the Electricity Act 1989); the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001; and the Wildlife and Countryside Act 1981. The Habitats Regulations set out the stages of the Habitats Regulations Appraisal (HRA) process required to assess the potential impacts of a proposed project on European Sites (Special Areas of Conservation, Special Protection Areas, candidate SACs and SPAs and Ramsar Sites).
<b>Habitats Regulations Appraisal</b>	The assessment of the impacts of implementing a plan or policy on a European Site, the purpose being to consider the impacts of a project against conservation objectives of the site and to ascertain whether it would adversely affect the integrity of the site.
<b>High Voltage Alternating Current (HVAC)</b>	Refers to high voltage electricity in Alternating Current (AC) form which is produced by the WTGs and flows through the IAC system to the OSCP. HVAC may also be used for onward power transmission from the OSCP to assets or to shore over shorter distances.
<b>High Voltage Direct Current (HVDC)</b>	Refers to high voltage electricity in Direct Current (DC) form which is converted from HVAC to HVDC at the OSCP and transmitted to shore over longer distances.
<b>Horizontal Directional Drilling (HDD)</b>	An engineering technique for laying cables that avoids open trenches by drilling between two locations beneath the ground's surface.
<b>Innovation and Targeted Oil &amp; Gas (INTOG)</b>	In November 2022, the Crown Estate Scotland (CES) announced the Innovation and Targeted Oil & Gas (INTOG) Leasing Round, to help enable this sector-wide commitment to decarbonisation. INTOG allowed developers to apply for seabed rights to develop offshore windfarms for the purpose of providing low carbon electricity to power oil and gas installations and help to decarbonise the sector. Cenos is an INTOG project and in November 2023 secured an Exclusivity Agreement as part of the INTOG leasing round.
<b>Inter-Array Cable (IAC)</b>	The cables which connect the WTGs to the OSCP. WTGs may be connected with IACs into a hub or in series as a 'string' or a 'loop' such that

TERM	DEFINITION
	power from the connected WTGs is gathered to the OSCP's via a single cable.
<b>Joint Venture</b>	The commercial partnership between Flotation Energy and Vårgrønn, the shareholders which hold the Exclusivity Agreement with CES to develop the Cenos site as an INTOG project.
<b>Landfall</b>	The area where the Export/Import Cable from the Array Area will be brought ashore. The interface between the offshore and onshore environments.
<b>Marine Licence</b>	Licence required for certain activities in the marine environment and granted under the Marine and Coastal Access Act 2009 and/or the Marine (Scotland) Act 2010.
<b>Marine Protected Area (MPA)</b>	Marine sites protected at the national level under the Marine (Scotland) Act 2010 out to 12 NM, and the Marine and Coastal Access Act 2009 between 12-200 NM. In Scotland MPAs are areas of sea and seabed defined so as to protect habitats, wildlife, geology, underseas landforms, historic shipwrecks and to demonstrate sustainable management of the sea.
<b>Marine Protected Area (MPA) Assessment</b>	A three-step process for determining whether there is a significant risk that a proposed development could hinder the achievement of the conservation objectives of an MPA.
<b>Mean High Water Springs (MHWS)</b>	The height of Mean High Water Springs is the average throughout the year, of two successive high waters, during a 24-hour period in each month when the range of the tide is at its greatest.
<b>Mean Low Water Springs (MLWS)</b>	The height of Mean Low Water Springs is the average throughout a year of the heights of two successive low waters during periods of 24 hours (approximately once a fortnight).
<b>Mitigation Measures</b>	<p>Measures considered within the topic-specific chapters in order to avoid impacts or reduce them to acceptable levels.</p> <ul style="list-style-type: none"> <li>• Primary mitigation - measures that are an inherent part of the design of the Project which reduce or avoid the likelihood or magnitude of an adverse environmental effect, including location or design;</li> <li>• Secondary mitigation – additional measures implemented to further reduce environmental effects to 'not significant' levels (where appropriate) and do not form part of the fundamental design of the Project; and</li> </ul>

TERM	DEFINITION
	<ul style="list-style-type: none"> <li>Tertiary mitigation – measures that are implemented in accordance with industry standard practice or to meet legislative requirements and are independent of the EIA (i.e. they would be implemented regardless of the findings of the EIA).</li> </ul> <p>Primary and tertiary mitigation are referred to as embedded mitigation. Secondary mitigation is referred to as additional mitigation.</p>
<b>Mooring System</b>	Comprising the mooring lines and anchors, the mooring system connects the floating substructure to the seabed, provides station-keeping capability for the floating substructure and contributes to the stability of the floating substructure and WTG.
<b>Nature Conservation Marine Protected Area (NCMPA)</b>	MPA designated by Scottish Ministers in the interests of nature conservation under the Marine (Scotland) Act 2010.
<b>Offshore Substation and Converter Platforms (OSCPs)</b>	An offshore platform on a fixed jacket substructure, containing electrical equipment to aggregate the power from the WTGs and convert power between HVAC and HVDC for export/import via the Export/Import cable to/from the shore. The OSCP will also act as power distribution stations for the Oil & Gas platforms.
<b>Onward Development</b>	Transmission projects which are anticipated to be brought forward for development by 3 <sup>rd</sup> party oil and gas operators to enable electrification of assets via electricity generated by the Project. All Onward Development will subject to separate marine licensing and permitting requirements.
<b>Onward Development Area</b>	The area within which oil and gas assets would have the potential to be electrified by the Project.
<b>Onward Development Connections</b>	Oil and gas assets located in the waters surrounding the Array Area will be electrified via transmission infrastructure which will connect to the Project's OSCP. These transmission cables are referred to as Onward Development Connections.
<b>Project Area</b>	The area that encompasses both the Array Area and EICC.
<b>Project Design Envelope</b>	A description of the range of possible elements that make up the Project design options under consideration and that are assessed as part of the EIA for the Project.
<b>Study Area</b>	Receptor specific area where potential impacts from the Project could occur.

TERM	DEFINITION
<b>Transboundary Assessment</b>	The consideration of impacts from the Project which have the potential to have a significant effect on another European Economic Area (EEA) state's environment. Where there is a potential for a transboundary effect, as a result of the Project, these are assessed within the relevant EIA chapter.
<b>Transmission Infrastructure</b>	The infrastructure responsible for moving electricity from generating stations to substations, load areas, assets and the electrical grid, comprising the OSCPs, and associated substructure, and the Export/Import Cable.
<b>Vårgrønn As (Vårgrønn)</b>	Joint venture partner in Cenoss Offshore Windfarm Ltd.
<b>Wind Turbine Generator (WTG)</b>	The equipment associated with electricity generation from available wind resource, comprising the surface components located above the supporting substructure (e.g., tower, nacelle, hub, blades, and any necessary power transformation equipment, generators, and switchgears).
<b>Worst-Case Scenario</b>	The worst-case scenario based on the Project Design Envelope which varies by receptor and/or impact pathway identified.

## 21 MAJOR ACCIDENTS AND DISASTERS

### 21.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the risk of major accidents and disasters associated with the offshore elements of the Cenoss Offshore Windfarm ('the Project'), including all offshore infrastructure and activities seaward of Mean High-Water Springs (MHWS) during construction, operation and maintenance and decommissioning.

This chapter has been produced in accordance with relevant legislation and guidance, as outlined in Section 21.2. Notably, this chapter follows the Institute of Environmental Management and Assessment (IEMA) (2020) guidance: 'Major Accidents and Disasters in EIA: A Primer', and therefore differs in structure compared with other EIAR chapters.

This chapter considers the potential significant effects arising from the vulnerability of the Project to major accidents and disasters from internal and external sources and also the potential for the Project to cause a major accident or disaster. The study draws on assessments within the following EIAR chapters:

- EIAR Vol. 2, Chapter 5: Project Description;
- EIAR Vol. 3, Chapter 8: Marine Geology, Oceanography and Coastal Processes;
- EIAR Vol. 3, Chapter 14: Commercial Fisheries;
- EIAR Vol. 3, Chapter 15: Shipping and Navigation;
- EIAR Vol. 3, Chapter 17: Marine Infrastructure and Other Sea Users;
- EIAR Vol. 3, Chapter 18: Military and Aviation; and
- EIAR Vol. 3, Chapter 20: Carbon and Greenhouse Gases.

Where information from other chapters is used to inform the impact assessment, reference to the relevant EIAR Chapter is given.

The IEMA (2020) guidance defines major accidents and disasters as:

- **Major accidents:** "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., fatalities or injury from blade failure) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events"; and
- **Disasters:** "may be a natural hazard (e.g., earthquake) or a man-made/external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident."

Major Accidents and Disasters associated with the Project may result from two main sources:

- **Internal:** the potential for the Project to cause a major accident and/or disaster; or
- **External:** the potential for the Project to interact with a major accident and/or disaster or to increase the risk of a major accident and/or disaster.

Major accidents and disasters can be further categorised into the categories outlined in Table 21-1.

Table 21-1 Major accidents and disasters categories and types

CATEGORY	TYPE	INTERNAL OR EXTERNAL HAZARD
Natural	Geophysical (e.g., earthquakes)	External
	Hydrological (e.g., flooding)	External
	Climatological and meteorological (e.g., thunderstorms)	External
	Biological (e.g., introduction of non-native species)	Internal or external
Technological or manmade hazards	Societal (e.g., industrial action)	Internal
	Major industrial accidents (e.g., major fires at nearby developments)	External
	Transport accidents and cable snagging (e.g., vessel collisions)	Internal or external
	Pollution accidents (e.g., accidental pollution events)	Internal or external
	Utility failures (e.g., electricity failures)	Internal
	Engineering accidents and failures (e.g., Floating Turbine Unit (FTU) breaking free)	Internal or external
	Malicious attacks (e.g., cyber-attacks)	External
	Ground hazards (e.g., Unexploded Ordnance (UXO) detonation)	Internal
	Workplace accidents	Internal

The following specialists have contributed to the assessment:

- [Redacted], Xodus Group;
- [Redacted], Xodus Group; and
- [Redacted], Xodus Group.

## 21.2 Legislation, policy, and guidance

The wider marine planning, legislation, policy and guidance is discussed in **EIAR Vol. 2, Chapter 3: Policy and Legislative Context**. The following key legislation, policy and guidance relate to the assessment of Major Accidents and Disasters:

- Legislation:
  - Health and Safety at Work etc. Act 1974;
  - Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
  - Construction (Design and Management) (CDM) 2015 Regulations;
  - Control of Major Accident Hazards Regulations 2015;
  - Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015;

- Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended); and
- Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended).
- Policy:
  - Scottish National Marine Plan (NMP)<sup>1</sup>: Prepared in accordance with the United Kingdom (UK) Marine Policy Statement, 2010, which outlines the framework for marine plans for the UK marine environment. Policies relevant to Major Accidents and Disasters include:
    - GEN 4 Co-existence: *“Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision making processes, when consistent with policies and objectives of this Plan”*;
    - GEN 5 Climate change: *“Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change”*; and
    - GEN 9 Natural heritage: *“Development and use of the marine environment must: (a) Comply with legal requirements for protected areas and protected species. (b) Not result in significant impact on the national status of Priority Marine Features. (c) Protect and, where appropriate, enhance the health of the marine area”*.
- Guidance:
  - IEMA (2020): Major Accidents and Disasters in EIA: A Primer;
  - Gormley *et al.* (2011): Guidelines for Environmental Risk Assessment and Management Green Leaves III;
  - Health and Safety Executive (HSE) (2015a). Control of Major Accident Hazards (COMAH) Regulations;
  - International Maritime Organization (IMO) (2018): Revised Guidelines for Formal Safety Assessment (FSA) for use in the IMO Rule-Making Process; and
  - HSE (2015b). OMAR guidance on The Offshore Installations (Offshore Safety Directive) (Safety Case etc) Regulations 2015.

The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended), The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) and the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) require the EIA to consider the following with relation to major accidents and disasters under The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended)<sup>2</sup>:

*“A description of the expected significant adverse effects of the works on the environment deriving from the vulnerability of the works to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to assimilated law such as any law that implemented Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC or Council Directive 2009/71/Euratom establishing a community framework for the nuclear safety of nuclear installations or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of any law that implemented the Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the*

<sup>1</sup> Following the most recent review of the National Marine Plan in 2021, the Scottish Ministers announced, in 2022, their intention to update the National Marine Plan. This update is underway but has not yet reached a draft consultation stage. A stakeholder engagement strategy and statement of public participation was published in August 2024.

<sup>2</sup> Specific text in relation to the requirement for consideration of major accidents or disasters differs slightly between the different EIA Regulations, however, this does not result in a material difference in the requirement for the assessment provided within this chapter.



*significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies."*

## 21.3 Scoping and consultation

Stakeholder consultation has been ongoing throughout the EIA and has played an important part in ensuring the scope of the baseline characterisation and impact assessment are appropriate with respect to the Project and the requirements of the regulators and their advisors.

The 2024 Scoping Report was submitted to Marine Directorate – Licensing Operations Team (MD-LOT) in April 2024, relevant stakeholders were consulted. The Scoping Opinion was received in September 2024. The 2024 Scoping Report and Scoping Opinion supersedes the 2023 Scoping Report and Scoping Opinion for the Project. Relevant comments from the Scoping Opinion specific to major accidents and disasters are provided in Table 21-2 below, which provides a high-level response on how these comments have been addressed within the EIAR.

No further consultation has been undertaken throughout the pre-application phase relevant to Major Accidents and Disasters.

Table 21-2 Comments from the Scoping Opinion relevant to Major Accidents and Disasters

REGULATOR/CONSULTEE	COMMENT	RESPONSE
Scottish Ministers	<p>The Scoping Report considers the vulnerability of the Proposed Development to major accidents and disasters in chapter 21. Table 21-3 of the Scoping Report details the technical guidance used by the Developer to design the assessment which includes the recent Institute of Environmental Management and Assessment (“IEMA”) ‘Major Accidents and Disasters in EIA: A Primer’. Appendix. Appendix 21A of Volume II of the Scoping Report presents the types of major accidents or disasters considered in the assessment and the justification for proposing to scope out all potential impacts from the construction and operation phases of the Proposed Development.</p>	Noted, no response required.
Scottish Ministers	<p>The Scottish Ministers are satisfied that in undertaking the assessment, the Developer has utilised the appropriate technical guidance and has considered the vulnerability of the Proposed Development to a potential accident or disaster and also the Proposed Development’s potential to cause an accident or disaster. The Developer proposes that mitigation measures to prevent, reduce or control any potential impacts will be embedded in the design of the Proposed Development and through adherence to other regulatory frameworks. Additionally, environmental effects associated with</p>	<p>The Applicant has taken the decision to include a further assessment of the vulnerability of the Project to major accidents and disasters and also the potential for the Project to cause a major accident or disaster.</p>

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REGULATOR/CONSULTEE	COMMENT	RESPONSE
	unplanned events will be addressed through the relevant receptor chapters and appropriately mitigated. On this basis, the Scottish Ministers are content for major accidents and disasters to be scoped out of the EIA Report.	

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## 21.4 Methodology

### 21.4.1 Overview

The assessment of the Project's vulnerability to Major Accidents and Disasters and also the potential for the Project to cause a major accident or disaster has followed the methodology set out in the IEMA (2020) guidance. The assessment of Major Accidents and Disasters involves three key steps:

- Screening (Section 21.4.2);
- Scoping (Section 21.4.3); and
- Assessment (Section 21.4.4).

### 21.4.2 Screening

The screening stage identifies whether a development has a vulnerability to Major Accidents and Disasters and also the potential for the Project to cause a major accident or disaster through a high-level consideration of the following:

- Whether a development could be a source of hazard that could result in a major accident and/or disaster;
- Whether a development could interact with any external sources of hazard that may make it vulnerable to a major accident and/or disaster; and
- Would the presence of a development increase the risk of a significant effect on the environment resulting from a major accident and/or disaster?

Based on the above criteria, it has been assessed that the Project is potentially vulnerable to and/or the Project could cause Major Accidents and Disasters, and this requires further assessment.

### 21.4.3 Scoping

The scoping stage considers the potential vulnerability of a development to Major Accidents and Disasters and/or to cause a major accident or disaster in further detail by considering the development location, type, context, existing and future constraints and likely receptors. A list of potential internal or external hazards (i.e. the source of the major accident and/or disaster) and receptors (i.e. features potentially affected by the major accident and/or hazard) is collated, based on existing sources of risk assessments (e.g. CDM risk register). Hazards can then be scoped in and out through the following key considerations:

- Major Accidents and Disasters can be scoped out for the following reasons:
  - There is no source-pathway-receptor linkage of a hazard that could trigger a major accident and/or disaster or potential for the development to lead to a significant environmental effect; and
  - All possible Major Accidents and Disasters are adequately covered elsewhere or covered by existing embedded mitigation measures or compliance with legislation and best practice.

The IEMA (2020) guidance goes further to state that the scope of the assessment should focus on low likelihood and high consequence events for the following reasons:

- Low likelihood, low consequence events are addressed in receptor assessments within the EIAR, where relevant (e.g. leaks and spills at construction sites); and
- High likelihood, high consequence events should already be designed-out by a development.

The 2024 Scoping Report scoped out all potential hazards related to the Project's potential to cause or be vulnerable to a major accident or disaster. In the 2024 Scoping Opinion Scottish Ministers agreed with this approach for major accidents and disasters to be scoped out of the EIAR. However, the Applicant has taken the decision to include a further assessment of the vulnerability of the Project to major accidents and disasters and also the potential for the Project to cause a major accident or disaster within this chapter. Section 21.6.2 outlines the internal and external hazards scoped in and out for the assessment of major accidents and/or disasters within this chapter.

## 21.4.4 Assessment

The assessment stage involves the following key steps:

- Step 1 – hazard identification (based on the worst-case for the grouped risk event<sup>3</sup>);
- Step 2 – identifying the likelihood and worst-case consequence;
- Step 3 – if a risk is deemed unacceptable, based on the assessment criteria, additional secondary mitigation measures are identified: and
- Step 4 – if, following the application of additional mitigations, the risk is still deemed significant then more detailed assessment of the residual risk is required to eliminate or reduce the risk to acceptable levels.

The assessment methodology is informed by the FSA process (IMO, 2018), which aims to ensure risks are reduced to As Low As Reasonably Practicable (ALARP). As such the methodology differs slightly from that presented in **EIAR Vol. 2, Chapter 7: EIA Methodology**.

### 21.4.4.1 Consequence

The reasonable worst-case consequence is identified for each grouped risk event, using professional judgement. The worst-case consequence is then assessed against the criteria set out in Table 21-3 to understand the potential for the consequence to constitute a major accident and/or disaster. The criteria for assigning consequence have been informed by FSA criteria (IMO, 2018) and are provided separately for each group of receptors: people and human health, material assets, and environment.

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<sup>3</sup> Risk events are unplanned events with the potential to result in a major accident and/or disaster and these are the subject of the risk assessment. A grouped risk event is a combined term that represents all sources and pathways that could lead to a major accident and/or disaster on a particular receptor.

Table 21-3 Consequence criteria

SEVERITY OF CONSEQUENCE	DEFINITION
Negligible	All receptors: No perceptible effect
Minor	<p>Population and human health: Minor injury or very short-term health concerns.</p> <p>Material assets: Minor damage.</p> <p>Environment: Local (on site) assistance required.</p>
Moderate	<p>People and human health: Multiple minor injuries or injuries resulting in medium health concerns (e.g., multiple days off work).</p> <p>Material assets: Damage to a level that is not critical to operations.</p> <p>Environment: Limited external assistance required.</p>
Serious	<p>Population and human health: Single fatality or injury resulting in permanent disability.</p> <p>Material assets: Damage to a level that results in a critical impact on operations.</p> <p>Environment: Regional assistance required.</p>
Major	<p>Population and human health: Multiple fatalities or injuries resulting in permanent disability.</p> <p>Material assets: Total loss of asset.</p> <p>Environment: National assistance required.</p>

#### 21.4.4.2 Likelihood

The likelihood of the reasonable worst-case consequence occurring relates both to the likelihood of the grouped risk event and the likelihood of the receptor being affected, and in both instances, embedded mitigation is taken into account. The recommendations from the IEMA (2020) guidance are presented in Section 21.4.3 and highlight the difference between low likelihood and high consequence events vs low likelihood and low consequence events. This chapter focusses only on low likelihood and high consequence events with the potential to result in a major accident and/or disaster (e.g., an FTU breaking free will have high consequence to project infrastructure and potentially human health), instead of assessing every potential grouped risk event. The grouped risk events considered for assessment were reduced in the 2024 Scoping Report, as outlined in Section 21.4.3. The Applicant has taken the decision to include a further assessment of the vulnerability of the Project to major accidents and disasters and also the potential for the Project to cause a major accident or disaster.

The likelihood criteria are set out in Table 21-4 and are based on FSA criteria (IMO, 2018).

Table 21-4 Likelihood criteria

LIKELIHOOD	DEFINITION
Negligible	Less than 1 occurrence per 10,000 years.
Extremely unlikely	1 occurrence per 100 to 10,000 years.
Remote	1 occurrence per 10 to 100 years.
Reasonably probable	1 occurrence per 1 to 10 years.
Frequent	Yearly occurrence.

#### 21.4.4.3 Risk rankings

The tolerability matrix used to determine the significance of effects from the frequency of occurrence and the severity of consequences is presented in Table 21-5. The risks are ranked as low (broadly acceptable), intermediate (tolerable with mitigation) and high (unacceptable). Low and intermediate risks are considered to be managed to an acceptable level. High risks are considered to be unacceptable. This chapter considers events of low likelihood of being remote or lower within the assessment.

Table 21-5 Tolerability matrix

<b>CONSEQUENCE</b>	<b>MAJOR</b>	Tolerable with mitigation	Tolerable with mitigation	Unacceptable	Unacceptable	Unacceptable
	<b>SERIOUS</b>	Broadly acceptable	Tolerable with mitigation	Tolerable with mitigation	Unacceptable	Unacceptable
	<b>MODERATE</b>	Broadly acceptable	Broadly acceptable	Tolerable with mitigation	Tolerable with mitigation	Unacceptable
	<b>MINOR</b>	Broadly acceptable	Broadly acceptable	Broadly acceptable	Tolerable with mitigation	Tolerable with mitigation
	<b>NEGLIGIBLE</b>	Broadly acceptable	Broadly acceptable	Broadly acceptable	Broadly acceptable	Tolerable with mitigation
		<b>NEGLIGIBLE</b>	<b>EXTREMELY UNLIKELY</b>	<b>REMOTE</b>	<b>REASONABLY PROBABLE</b>	<b>FREQUENT</b>
		<b>LIKELIHOOD</b>				

## 21.5 Baseline characterisation

In line with the EIA Directive the baseline characterisation herein is informed by the baselines provided in several EIAR chapters in order to identify the hazards of relevance to the Project and inform the risk assessment, rather than collecting survey data (as is typically the case for other EIA receptor topics). The following chapters include details on the baseline characterisation to inform the Major Accidents and Disasters chapter:

- EIAR Vol. 2, Chapter 5: Project Description;
- EIAR Vol. 3, Chapter 8: Marine Geology, Oceanography and Coastal;
- EIAR Vol. 3, Chapter 14: Commercial Fisheries;
- EIAR Vol. 3, Chapter 15: Shipping and Navigation;
- EIAR Vol. 3, Chapter 17: Marine Infrastructure and Other Sea Users;
- EIAR Vol. 3, Chapter 18: Military and Aviation; and
- EIAR Vol. 3, Chapter 20: Carbon and Greenhouse Gases.

Each of the topic-specific assessment chapters present the future baseline for that topic taking into account, for example, climate change or changes in use of the marine environment (e.g., changes in fishing practices, vessel use and developments). **EIAR Vol. 3, Chapter 20: Carbon and Greenhouse Gases** provides a description of the future baseline environment associated with climate change, including changes in extreme weather events such as an increased frequency in heavy rainfall events, storms and heat waves, as well as changes in average weather and sea conditions such as rises in sea level, increased air and sea temperatures, decreased summer rainfall and increased winter rainfall.

### 21.5.1 Study area

The principal Study Area for the assessment of Major Accidents and Disasters is the Offshore Site, i.e., the area in which the Project is to be located within the Central North Sea (CNS). The Study Area has been adapted to capture the internal and external influencing factors that have high adverse consequences on the Project (see Table 21-1 for specific categorisation):

- Manmade features:
  - Airports and airfields within 13 km (the general safeguarding zone);
  - COMAH facilities within 5 km;
  - Nuclear installations within 3 km (distance to The Land Use Planning Outer Consultation Zone);
  - Oil and gas installations within 500 m; and
  - Subsea installations within 500 m.
- Natural Features:
  - 3 km (chiefly hydrological and geological, for example seismic activity); and
  - 1 km (chiefly hydrological and geological, for example, unstable ground).



## 21.6 Risk Assessment

### 21.6.1 Embedded mitigation

As part of the Project design process, embedded mitigation measures and management plans have been proposed, and those that reduce the potential for Major Accidents and Disasters are listed in Table 21-6. There is a commitment to implement these measures and they are considered inherently part of the design of the Project. Therefore, they have been considered in the assessment of risks scoped into the assessment and presented below (i.e., the determination of magnitude of consequence and therefore significance of effects assumes implementation of these measures).

Table 21-6 Embedded mitigation measures relevant to major accidents and disasters

CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
MM-005	Target Depth of Lowering (DoL)	Primary	Static cables will be trenched and buried to a minimum depth of 0.4 m. Where this cannot be achieved, remedial cable protection will be applied. The cable burial target depth is informed by a Cable Burial Risk Assessment (CBRA) and implemented through the Cable Plan (CaP), which will be produced post-consent. EMF emissions associated with the cabling will be reduced by burial of between 90-100% of the cables at the depth between 0.4 – 1.5 m.	Final cable design will be informed by the CBRA and detailed within the CaP, required under Section 36 Consent and/or Marine Licence conditions.
MM-006	Environmental Management Plan (EMP)	Tertiary	The EMP will set out procedures to ensure all activities with the potential to affect the environment are appropriately managed and will include a description of planned activities and procedures, roles and responsibilities, pollution control and spillage response plans, incident reporting, chemical usage requirements, waste management plans, plant service procedures, communication and reporting structures, and programme of work. It will detail the final design selected and take into account Marine Licence conditions and commitments. The EMP will additionally include an Invasive Non Native Species (INNS) Management Plan (INNSMP) and a Marine Pollution Contingency Plan (MPCP) and will be developed in consultation with stakeholders.	The EMP, including the INNSMP and MPCP, will be required under Section 36 Consent and/or Marine Licence conditions.  An outline EMP is provided as part of the Application <b>EIAR Vol. 4, Appendix 32: Outline EMP</b> .
MM-007	Construction Method Statement (CMS)	Tertiary	A CMS will be developed to manage the construction process so as to avoid harm to construction personnel and third parties. The CMS will specify the Project's construction	The CMS will be required under Section 36 and/or Marine Licence conditions.

CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
			methods, setting out good practice construction measures and how agreed mitigation measures from the EIAR, associated documents, Section 36 Consent, Marine Licences and those stated within the EMP are implemented during construction.	
MM-008	Cable Plan (CaP)	Tertiary	The CaP will be provided post-consent and will detail the location / route and cable laying techniques of the IAC and Export / Import Cable and detail the methods for cable surveys during the operational life of the cables for the Project. This will be supported by survey results from the geotechnical, geophysical and benthic surveys. The CaP will also detail electromagnetic fields of the cables deployed and methods to mitigate against any effects of EMF. A CBRA will also be undertaken and results included within the CaP which will detail cable specifications, cable installation, cable protection, target burial depths / depth of lowering and any hazards the cable will present during the lifespan of the cable. The CaP will also include methodologies of post construction and operational surveys and methodologies for cable inspection with measures to address and report any exposure of cables.	Final cable design will be informed by the CBRA and detailed within the CaP, required under Section 36 Consent and/or Marine Licence conditions.
MM-009	Decommissioning Programme	Tertiary	The development of, and adherence to, a Decommissioning Programme, approved by Scottish Ministers prior to construction and updated throughout the Project's operational life. This will be written in accordance with applicable guidance and will detail the required activities, programme and environmental management for decommissioning.	The Decommissioning Programme will be required under Section 105 of the Energy Act 2004 (as amended) and a condition of the Section 36 consent.

CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
MM-010	Marine Pollution Contingency Plan (MPCP)	Tertiary	Accidental releases to the marine environment will apply strict environmental controls through the implementation of the EMP, which will include a MPCP. These plans will detail procedures in the event of an accidental release, characterise all sources for potential contaminant releases and provide key emergency contact details for use in the event of a release. Measures detailed in the EMP and MPCP will be in accordance with Oslo-Paris Convention (OSPAR) and Marine Pollution (MARPOL) Convention guidelines for preventing pollution at sea. Individual vessels will also have a Ship Oil Pollution Emergency Plan (SOPEP) in place. For these reasons, the potential for accidental release of contaminants is extremely unlikely and any incidents would be responded to quickly, with strict controls to effectively minimise the scale and impact of any accidental release on the marine environment.	The MPCP will be required under Section 36 Consent and/or Marine Licence conditions as part of the EMP.  An outline EMP is provided as part of the Application <b>EIAR Vol. 4, Appendix 32: Outline EMP</b> .
MM-016	Minimum spacing between FTUs	Primary	928 m spacing between FTU structures at the surface and a minimum of 50 m between anchors.	The final layout will be detailed within the DSLP, required under Section 36 and/or Marine Licence conditions.
MM-018	Unexploded Ordnance (UXO) clearance approach	Primary	In the event that a UXO is identified within the Project construction area, a hierarchy of mitigation will be applied: <ul style="list-style-type: none"> <li>• Micro-siting/micro-rerouteing will be used to avoid UXO in the first instance.</li> <li>• Where micro- siting/micro-rerouting is not possible, the UXO will be moved to a safe location outwith the corridor or working area;</li> </ul>	Any clearance activity will be subject to a separate Marine Licence and European Protected Species (EPS) Licence, which will be accompanied by supporting environmental information.

CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
			<ul style="list-style-type: none"> <li>In cases where UXO cannot be avoided or pose a safety concern, Low Order clearance methods, such as deflagration will be applied.</li> </ul> <p>In cases where UXO cannot be avoided or pose a safety concern and Low Order clearance methods have not been successful, High Order (i.e. detonation) may be required. However, this method will only be used where absolutely necessary, in agreement with Scottish Ministers.</p>	
MM-019	Piling Strategy (PS) (if impact piling is required)	Tertiary	<p>If impact piling is selected as the optimal installation mechanism for the FTUs/OSCPs, a Piling Strategy will be produced for the Project and implemented in line with relevant guidance. The strategy will provide details on the piling activities and parameters, expected noise levels, duration of activities and any required mitigations associated with this installation technique.</p> <p>The Piling Strategy will delineate the requirement for and nature of noise mitigation measures to be implemented (documented in the Marine Mammal Mitigation Protocol (MMMP)) during piling activities (including soft-start and ramp-up procedures).</p>	<p>The Piling Strategy will be required under Section 36 Consent and/or Marine Licence conditions.</p> <p>An outline MMMP is provided as part of the Application <b>EIAR Vol. 4, Appendix 33: Outline MMMP</b>.</p>
MM-021	Vessel Management Plan (VMP)	Tertiary	<p>A VMP will be developed and adhered to for the Project. The VMP will detail types, specifications and numbers of vessels, how vessel management will be coordinated and the location of ports, routes of passage and number of transits for the Project. The VMP will refer to the Scottish Marine Wildlife Watching Code and Guide to Best Practice for Watching</p>	<p>A VMP will be required under the Section 36 Consent and/or Marine Licence conditions.</p>

CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
			Marine Wildlife for guidance on how vessels should behave around Marine Wildlife.	
MM-025	The use of guard vessels and Offshore Fisheries Liaison Officers (OFLOs)	Primary	Where required, guard vessels and OFLOs will be in place within the marine environment during the construction phase, major maintenance and decommissioning works where required. Guard vessels will ensure that effective communication between the Project and other sea users (including commercial fishers) is maintained, therefore reducing the potential for interactions between fishers and Project vessels and activities.	<p>Requirements will be detailed within the Fisheries Management and Mitigation Strategy (FMMS), required under Section 36 Consent and/or Marine Licence conditions.</p> <p>An outline FMMS is provided as part of the application <b>EIAR Vol. 4, Appendix 34: Outline FMMS</b>.</p>
MM-026	Fisheries Management and Mitigation Strategy (FMMS)	Tertiary	The FMMS will be developed further in consultation with the fishing industry post consent. The FMMS will expand on the detail of the Project's approach to fisheries liaison and co-existence within the marine environment	<p>Required under Section 36 Consent and/or Marine Licence conditions.</p> <p>An outline FMMS is provided as part of the Application <b>EIAR Vol. 4, Appendix 34: Outline FMMS</b>. The outline FMMS also contains details on the proposed approach for fisheries liaison.</p>

CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
MM-028	Promulgation of information, such as Notice to Mariners (NtM), Kingfisher notifications and other navigational warnings	Tertiary	Timely and efficient distribution of NtM and Kingfisher notifications will inform third party vessels of the position and nature of works associated with the Project. Information will include but not be limited to vessel routes, timings and locations, safety zones and advisory safe passing distances as required.	<p>Procedures will be detailed within the Navigational Safety Plan (NSP) and the FMMS, required under Section 36 and/or Marine Licence Conditions.</p> <p>An outline FMMS is provided as part of the Application <b>EIAR Vol. 4, Appendix 34: Outline FMMS</b>.</p>
MM-031	Lighting and Marking Plan (LMP)	Tertiary	<p>The LMP will set out specific requirements in terms of aviation lighting to be installed on the WTGs, as required under CAA (2016) "CAP 393, Air Navigation: The Order and the Regulations". The LMP will be prepared in consultation with the CAA, MoD, MCA and Northern Lighthouse Board (NLB) and will consider requirements for aviation lighting as specified in Article 223 of the UK ANO (CAA, 2016) and changes to International Civil Aviation Organisation Annex 14 (2016).</p> <p>The LMP will set out specific requirements in terms of marine lighting and marking of the WTGs and OSCPS during the construction and operational phases. This will comply with NLB requirements, the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162 Guidance on the Marking of Offshore Man-Made Structures (IALA, 2021), and MGN 654 (MCA, 2021).</p>	Lighting and marking requirements will be detailed in the LMP, required under Section 36 Consent and/or Marine Licence conditions.

CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
MM-032	Development Specification and Layout Plan (DSLPL)	Tertiary	The DSLPL will confirm the final specification and layout of the Project Area. The Plan will include location and coordinates of all Offshore Wind Farm (OWF) infrastructure including cables and the final design parameters of the OWF.	The DSLPL will be required under Section 36 Consent and/or Marine Licence consent conditions.
MM-033	Charting of installed infrastructure	Tertiary	<p>Notification to the UK Hydrographic Office (UKHO) and Kingfisher of the proposed location and programme of works will facilitate the promulgation of maritime safety information and updating of nautical/admiralty charts and publications. All Project infrastructure (including FTUs, substations, subsea cables and mooring lines) will be marked on appropriately scaled nautical charts.</p> <p>All structures more than 91.4 m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre (DGC) (Digital Vertical Obstruction File) at least ten weeks prior to construction in line with the LMP.</p>	<p>Charting requirements will be secured under a Marine Licence condition. Details will also be included in the FMMS, LMP, and NSP required under the Section 36 Consent and/or Marine Licence conditions.</p> <p>An outline FMMS is provided as part of the Application <b>EIAR Vol. 4, Appendix 34: Outline FMMS</b>.</p>
MM-034	Navigational Safety Plan (NSP)	Tertiary	The NSP provides information on navigational safety for the Project. It will provide the required information on navigational safety measures, construction exclusion zones (if relevant) NtMs and radio navigation warnings, anchoring areas, temporary construction lighting and marking, buoyage, post construction monitoring and hydrographic surveys taking into account all recommendations in the MGN 654 and its annexes.	The NSP will be required under Section 36 Consent and/or Marine Licence conditions.
MM-035	Application for and adherence to implementation of safety zones	Primary	Safety zones will be applied during construction and periods of major maintenance, and either statutory or advisory safety zones during operation (to be agreed during further consultation). Full details will be provided in the safety zone	An application for safety zones will be made in accordance with Section 95 of the Energy



CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
			<p>application; however, it is likely that the standard set of safety zones will be applied for:</p> <ul style="list-style-type: none"> <li>• Statutory 500 m rolling safety zones around FTUs and OSCP's where construction is ongoing as denoted by the presence of a construction vessel;</li> <li>• Safety zones of 50 m will be in place around FTUs and OSCP's during the construction phase when construction is not underway prior to commissioning of the windfarm; and; and</li> <li>• Temporary 500 m safety zones around structures where major maintenance is ongoing (as defined in The Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007).</li> </ul> <p>Where safety zones do not apply (e.g., around cable installation), use of advisory safe passing distances will be implemented.</p>	<p>Act 2004 and the Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007.</p> <p>Details will be included within the NSP, required under Section 36 Consent and/or Marine Licence conditions.</p>
MM-036	Establishment of a Marine Coordination Centre	Primary	<p>The Marine Coordination Centre is the hub of the Project during construction and will also be used for operations and maintenance. The purpose of a Marine Coordination Centre is to ensure Project vessels are suitably managed to minimise the likelihood of involvement in incidents and ensure safe operation during all phases. Personnel within the Marine Coordination Centre function as the first point of contact for vessels operating within the Project Area and agreed transit routes.</p>	<p>Details of marine coordination will be provided within the VMP and NSP required under Section 36 Consent and/or Marine Licence conditions.</p>

CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
MM-037	Compliance with Marine Guidance Note 654.	Tertiary	<p>The Project will comply with MGN 654 and its annexes to ensure that impacts on navigational safety and emergency response are considered, assessed and mitigated where necessary. This includes post-consent completion of the Search and Rescue (SAR) Checklist, which includes the completion of an Emergency Response Cooperation Plan (ERCoP). This will include, but is not limited to:</p> <ul style="list-style-type: none"> <li>• Layout design;</li> <li>• Agreement of SAR checklist and ERCoP with MCA;</li> <li>• Hydrographic surveys; and</li> </ul> <p>Maximum 5% reduction in surrounding charted depths referenced to Chart Datum unless otherwise agreed with the Scottish Ministers in consultation with MCA.</p>	Compliance with MGN 654 will be detailed within the NSP and ERCoP required under Section 36 Consent and/or Marine Licence conditions.
MM-040	Crossing and proximity agreements	Primary	<p>Crossing and proximity agreements for existing seabed infrastructure such as pipelines and cables will be agreed post-consent with the relevant asset owners, once the Project layout has been finalised. It will be the responsibility of the respective Pipeline Asset Operators to inform the NSTA and also the OPRED's - Offshore Decommissioning Unit (OPRED-ODU) to determine if any updates to existing Pipeline Works Authorisations (PWAs) or decommissioning plans are required. Cable crossings will be perpendicular (or as close as possible to 90°) to minimise the physical interaction and therefore limit the risk of damage to the existing pipeline or cable.</p>	Secured through consultation with relevant stakeholders and the commitment of the Applicant to discuss and establish crossing and proximity agreements with relevant third-parties. This will be part of a commitments register that will be tracked as the Project progresses alongside Section 36 Consent and Marine Licence conditions.
MM-042	Notice to Aviation (NOTAM) system	Primary	<p>Any temporary obstacles associated with FTUs which are more than 91.4 m in height (e.g. construction infrastructure</p>	Commitment to notification of temporary obstacles and will



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CODE	MITIGATION MEASURE	TYPE	DESCRIPTION	SECURED BY
			such as cranes and/or meteorological masts) are to be alerted to aircrews by means of the NOTAM system, in line with consultation with the CAA	also be detailed in the NSP which will be required under the Section 36 Consent and/or Marine Licence conditions.

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## 21.6.2 Hazard identification

In line with the scoping stage outlined in Section 21.4.3, a list of internal and external hazard sources) has been collated and a scoping exercise was conducted to identify those hazards that require further assessment in Section 21.7. Hazards have been identified through the review of internal risk registers (e.g., CDM risk register) and offshore EIA topic-specific chapters. Section 21.6.2.1 lists the hazards scoped in for further assessment and Section 21.6.2.2 lists the hazards scoped out for further assessment.

### 21.6.2.1 Hazards requiring assessment

The hazards identified as requiring consideration within the assessment of Major Accidents and Disasters are listed in Table 21-7.

Table 21-7 Hazards scoped into the assessment

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
<b>Technological or Manmade Hazards - major industrial accidents</b>	Major fires	✓	X	Population and human health / material asset / marine environment	It is possible that electrical faults could occur during the operation of the Project which could result in fires. Major fires could pose a health and safety risk to Project personnel and third parties and potentially damage Project and/or third-party infrastructure and vessels.
<b>Technological or Manmade Hazards – transport accidents</b>	Third-party vessel or aviation collision and allision	X	✓	Population and human health / material asset / marine environment	It is possible that third-party vessel or aviation collision could impact on the Project or Project vessels, either on site or in transit to site. The presence of Project vessels and infrastructure may increase encounters and collision risk for third-party vessels and aviation receptors in the area. This risk could result in potential injury, fatalities, damage to assets and/or vessels. <b>EIAR Vol. 3, Chapter 15: Shipping and Navigation</b> includes information on potential third-party vessel collisions and allisions with Project infrastructure or vessels and <b>EIAR Vol. 3, Chapter 18: Military and Civil Aviation</b> outlines the potential impact of the Project to aviation receptors, including on low-flying aircraft and helicopters.

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
<b>Technological or Manmade Hazards – transport accidents</b>	Project vessel or aviation collision or allision	✓	X	Population and human health / material asset / marine environment	There is the potential for accidents to occur on transiting Project vessels or helicopters transporting equipment or personnel which could lead to fatalities or injury to Project personnel or third parties, and damage to Project and/or third-party infrastructure and vessels. <b>EIAR Vol. 3, Chapter 15: Shipping and Navigation</b> includes information on potential third-party vessel collisions with Project vessels and <b>EIAR Vol. 2, Chapter 5: Project Description</b> outlines the vessel and helicopter requirements for the Project.
<b>Technological or Manmade Hazards – cable snagging</b>	Third-party cable snagging	X	✓	Population and human health / material asset / marine environment	There is a risk of a third-party vessel snagging or damaging the dynamic Inter-Array Cables (IAC), Export/Import Cables or mooring lines. As described in <b>EIAR Vol. 3, Chapter 14: Commercial Fisheries</b> , snagging of fishing gear on Project infrastructure may result in potential injury, fatalities, damage to assets and/or vessels.
<b>Technological or Manmade Hazards – ground hazards</b>	UXO detonation	X	✓	Population and human health / material asset / marine environment	There is the potential for a major accident to arise from UXO being unintentionally encountered which would pose a health and safety risk to people, and potential damage to Project and/or third-party infrastructure and vessels. <b>EIAR Vol. 2, Chapter 5: Project Description</b> and <b>EIAR Vol. 3, Chapter 17: Marine Infrastructure and Other Sea Users</b> provide a description of the Potential UXO (pUXO) at the Project Area.
<b>Technological or Manmade Hazards –</b>	FTU breaking free	✓	X	Population and human health /	It is possible that FTUs could break free from their moorings or during tows, which could pose a health and safety risk to

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
engineering accidents and failures				material asset / marine environment	Project personnel and third-parties, and potential damage to Project and/or third-party infrastructure and vessels.

### 21.6.2.2 Hazards scoped out of the assessment

The hazards scoped out of the assessment, and the justification for this, are listed in Table 21-8. Generally, it is considered that the risks associated with the development of offshore structures are well understood and adequately managed through existing processes and risk assessments, such as the CDM Regulations and best practice.

Table 21-8 Hazards scoped out of the assessment

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
Natural hazards – geophysical	Earthquakes	X	✓	Population and human health / material asset	<p>The British Geological Survey (BGS) identifies that on average, a magnitude 4 earthquake happens in Britain roughly every two years and a magnitude 5 earthquake occur around every 10 to 20 years. (Magnitude 4 to 5 Earthquakes cause noticeable shaking of indoor objects and rattling noises. Generally, causes zero to minimal damage to infrastructure. Moderate to significant damage is very unlikely.) Earthquakes are almost completely absent off eastern Scotland, and most that occur result in no damage (BGS, 2024a). A review of the BGS data on recent earthquake events indicates that a magnitude 3.0 earthquake occurred in the CNS, 235 km east of Aberdeen and was felt by workers on the Production / Utilities / Quarters (PUQ) platform at the Elgin-Franklin gas and oil field (BGS, 2024a).</p> <p>The North Sea experiences low to moderate seismic activity (BGS, 2024b) which can add strain to mooring systems, increasing the risk of FTUs breaking free and colliding with vessels or oil and gas assets. However, the design of the anchoring system will take into account the low to moderate seismic activity associated with the local area. Therefore, it is considered that this risk event can be scoped out and does not require further assessment.</p>



CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
Natural hazards – geophysical	Volcanic activity	X	✓	Population and human health / material asset	The Project is not in an active volcanic area, and it is highly unlikely that an ash cloud could significantly impact on any aspect of the Project, due to the large distance between the project and the nearest area of volcanic activity in Iceland. There are currently no records of impacts of ash clouds on offshore wind farms. Therefore, it is considered that this risk event can be scoped out and does not require further assessment.
Natural hazards – geophysical	Tsunamis	X	✓	Population and human health / material asset	Tsunamis have been recorded in the UK's history but are extremely rare. As described above for earthquakes, the North Sea is an area of low to moderate seismic activity and a tsunami. However, a tsunami hazard is considered to be low in the North Sea. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.
Natural hazards – geophysical	Landslides and sinkholes	X	✓	Population and human health / material asset	This risk event can be excluded from further assessment in the EIAR, which only considers elements of the Project seaward of MHWS.
Natural hazards – hydrological	Coastal flooding	X	✓	Population and human health / material asset	All of the construction works associated with the Project will take place within the marine environment and will not impact on coastal flooding and the offshore elements of the Project are not vulnerable to this hazard. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.
Natural hazards – climatological and meteorological	Cyclones, hurricanes, storms and gales	X	✓	Population and human health / material asset	Cyclones, hurricanes and typhoons do not occur in the UK. The Project may be vulnerable to severe weather events, such as high winds (including tornadoes) and storm surges, which may increase in the future due to climate change.

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
					<p>During the construction phase, works would be paused during storm conditions and it would be ensured that all equipment is secured safely. During the operational phase storms may add strain to mooring systems, increasing the risk of FTUs breaking free and colliding with vessels, windfarms, marine aquaculture sites or oil and gas assets. However, the design of the anchoring system will take into account the weather conditions associated with the local area. WTGs have a cut-out speed at which the WTG automatically shuts down to prevent unnecessary strain on the rotor. In addition, built-in mechanisms lock and feather the blades (twisting them so that they no longer catch the wind and rotate) when wind speeds exceed this cut-out speed.</p> <p>Wind speeds in excess of 100 miles per hour were experienced in the south east of England during the recent Storm Ciaran in 2023. However, this did not result in any damage or reported issues of the Rampion Offshore Wind Farm, London Array Offshore Wind Farm, Thanet Offshore Wind Farm or Kentish Flats (Renew.Biz, 2023).</p> <p>Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
Natural hazards – climatological and meteorological	Thunderstorms	X	✓	Population and human health / material asset	<p>The Project may be vulnerable to thunderstorms and lightning strikes, which may increase in the future due to climate change.</p> <p>During the construction phase, works would be paused during storm conditions and it would be ensured that all equipment is secured safely. Lightning strikes may cause damage to infrastructure or interfere with electrical systems, potentially resulting in fires. However, each blade will be fitted with a lightning protection system to minimise any impact of lightning strikes and infrastructure will be</p>

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
					inspected at routine intervals to remediate any potential damage caused by lightning strikes. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.
<b>Natural hazards – climatological and meteorological</b>	Wave surges	X	✓	Population and human health / material asset	<p>Sea levels are expected to continue to rise in coming years, and it is projected that sea levels could rise to 0.21 – 0.62 m in Edinburgh, above the 1981 – 2000 baseline by the 2080s under the high emissions scenario (Horsburgh <i>et al.</i>, 2020). There is projected to be a reduction in mean significant wave height in the North of the UK through to 2100 but that the most severe / extreme wave heights may increase (Bricheno <i>et al.</i>, 2023).</p> <p>During the construction phase, works would be paused during wave surges and it would be ensured that all equipment is secured safely. The Project design will take into account the weather conditions associated with the local area. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
<b>Natural hazards – climatological and meteorological</b>	Extreme temperatures	X	✓	Population and human health / material asset	<p>Average temperatures are expected to rise in the UK with hotter and drier summers expected and generally warmer winters. For example, ‘hot summer days’ are expected to increase in the 2070s by 3.7 – 6.8 °C under the high emissions scenario. Furthermore, the frequency of heatwaves is expected to increase (Met Office, 2019). It is expected that colder than average winters and summers will become less frequent with a reduced probability of heavy snow, although the risk of cold extremes will not disappear (Met Office, 2024).</p> <p>During the construction phase, works would be paused during extreme weather conditions, as required in line with health and safety protocols. The Project</p>

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
Natural hazards – climatological and meteorological	Severe space weather	X	✓	Population and human health / material asset	<p>infrastructure will be designed in accordance with appropriate standards, fitted with appropriate control systems and will be subject to regular inspection and preventative maintenance. The design of infrastructure will include, for example, de-icing systems / coatings to minimise ice formation and accumulation and ice shedding from blades which may pose a risk to both workers and nearby infrastructure; weather monitoring; and insulation / heating or cooling mechanisms. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p> <p>Severe space weather events (e.g., solar flares or coronal mass ejections) are known to interrupt radio and other electronic communications (Department for Business, Energy, &amp; Industrial Strategy (BEIS), 2021). Severe space weather has the potential to significantly disrupt the national electricity grid and may cause electronic equipment to malfunction. There is no known significant impact on offshore wind farm infrastructure however, the transformers associated with the High Voltage Direct Current (HVDC) convertor station may be vulnerable to controlled mass ejections. However, it is expected that this will likely cause local disruption with limited potential for a major accident and/or disaster. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
Natural hazards – climatological and meteorological	Fog and poor air quality	X	✓	Population and human health / material asset	<p>Fog is one of the most common weather conditions in the UK and can dramatically reduce visibility which could increase the potential for vessel or aircraft collisions. However, appropriate marking and charting of infrastructure will be in place, as well as the establishment of safety zones during construction and major repairs during operation and maintenance. If required, construction activities would pause during periods of severe fog.</p>

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
					<p>It is not expected that the Project will result in poor air quality and all project vessels will be compliant with air quality guidelines.</p> <p>Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
<b>Natural hazards – biological</b>	Plants	✓	✓	Marine environment	<p>The potential for effects associated with non-native species on benthic species and habitats and their potential significance will be assessed in the <b>EIAR Vol. 3, Chapter 10: Benthic Ecology</b>. Embedded mitigation will reduce the risk of introduction and spread of non-native species and a major accident and/or disaster in relation to this hazard is not expected. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
<b>Technological or Manmade Hazards – societal</b>	Industrial action	✓	X	Population and human health / material asset	<p>The Project is not considered to be highly controversial and should not lead to high profile public demonstrations. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
<b>Technological or Manmade Hazards – major industrial accidents</b>	Major Accident Hazard Chemical sites	X	✓	Population and human health / material asset / marine environment	<p>There are no COMAH sites within a 5 km radius of the Project. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
<b>Technological or Manmade Hazards –</b>	Major Accident	X	✓	Population and human health / material asset /	<p>Even in the presence of MAH pipelines, sufficient safety measures are required to be adhered to reduce the risk of any major accidents and/or disasters in line with relevant regulations, such as the Pipeline Safety Regulations 1996, Therefore, it is</p>

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
major industrial accidents	Hazard Pipelines			marine environment	considered that this risk event type can be scoped out and does not require further assessment.
Technological or Manmade Hazards – major industrial accidents	Major accident on nearby offshore oil and gas platforms	X	✓	Population and human health / material asset / marine environment	As required by The Offshore Installations (Offshore Safety Directive) (Safety Case etc) Regulations 2015, all offshore installations have a 500 m Safety Zone to protect the safety of people working on or in the immediate vicinity of the installation, and the installation itself, against damage which may be incurred by vessel impact. There are no oil and gas platforms within a 500 m radius of the FTUs. The closest oil and gas platform is 7 km to the north from the Export/Import Cable Corridor (EICC), with the closest platform to the Array Area being 14.1 km to the east. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.
Technological or Manmade Hazards – major industrial accidents	Major accident at nuclear establishments	X	✓	Population and human health / material asset / marine environment	There are no nuclear sites within a 5 km radius of the Project. As there are no sites nearby there is no potential for any cascading effects in the event of a nuclear accident. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.
Technological or Manmade Hazards – major industrial accidents	Major accident in relation to fuel storage	✓	X	Population and human health / material asset / marine environment	There will be no bulk fuel storage associated with the Project. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
Technological or Manmade Hazards – pollution accidents	Pollution accidents	✓	X	Population and human health / marine environment	<p>At the Project Area, no emissions to air will be produced other than those associated with construction and maintenance vessels and those associated with any sulphur hexafluoride (SF<sub>6</sub>) at the OSCP, if used<sup>4</sup>. The International Convention for the Prevention of Pollution from Ships (MARPOL) compliant vessels will be utilised for all works during the construction and operational phases of the Project in order to minimise potential impacts on air quality.</p> <p>The project is also part of the North Sea Emission Control Area (ECA) providing a second level of control to ships on a regional basis under Regulations 13.6 and 14.3 of MARPOL Annex VI. ECAs impose additional emission standards to prevent, reduce and control NO<sub>x</sub> (nitrogen oxides) or SO<sub>x</sub> (sulphur oxides) (and indirectly limiting Particular Matter (PM)) emissions from ships. Vessels operating in an ECA will be required to take actions to ensure they are compliant with the more stringent limits that operate in the area.</p> <p>There is a risk of pollution being accidentally released during the construction and operation phases from sources including vessels and equipment. The risk and impact of accidental releases of hazardous substances will be reduced through the implementation of the EMP, including measures for compliance with international requirements of the MARPOL convention, as well as best practice for works in the marine environment (e.g., preparation of Shipboard Oil Pollution Emergency Plans (SOPEP)). In this manner, accidental release of potential contaminants from</p>

<sup>4</sup> Please note that the emissions associated with embodied carbon or component transport are assessed in EIAR Vol. 3. Chapter 20: Carbon and Greenhouse Gases. Further details on the use of SF<sub>6</sub> for the Project can also be found in EIAR Vol. 3, Chapter 20: Carbon and Greenhouse Gases. It is assumed, as a worst-case, that SF<sub>6</sub> may be used as insulation and that no leakage would occur.

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
					<p>construction vessels will be strictly controlled and procedures will be in place to minimise the impact of any accidental release if it occurs.</p> <p>The chemical content on an individual FTU is very low. If a highly toxic chemical was present, there is no likelihood of a significant consequence from a spill.</p> <p>Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
<b>Technological or Manmade Hazards – utility failures</b>	Electricity failure	✓	X	Population and human health / material asset / marine environment	<p>The Project will not cause widespread electricity failure. Any event that has the potential to disrupt the network will be controlled via the implementation of software and hardware solutions that are required to be implemented and tested as part of grid code compliance prior to the Project commencing operation. It is expected that any widespread electricity failure which may affect the Project would be temporary with no potential to result in a major accident and/or disaster. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
<b>Technological or Manmade Hazards – utility failures</b>	Gas failure	✓	X	Population and human health / material asset / marine environment	<p>There is no gas use associated with the Project. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
<b>Technological or Manmade Hazards – engineering</b>	System failure	✓	X	Population and human health / material asset	<p>There is the potential that system failures of the Project could occur, resulting in malfunctions (e.g., loss of a blade at sea). For example, in early 2024, a 20 m Section of a damaged blade from the Humber Gateway Offshore Wind Farm was lost at sea. No one was injured in the area (OffshoreWind.biz, 2024). Similarly, in May 2024</p>



CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
accidents and failures					<p>damage was sustained to a single blade of the Dogger Bank A offshore wind farm, but in accordance with safety procedures, relevant authorities were notified to ensure other marine users were aware of the safety risk (Dogger Bank Wind Farm, 2024).</p> <p>Fault detection systems will be in place for the Project, and it is expected that any risk of injury to Project personnel or third-party vessels would be restricted to the immediate vicinity of Project infrastructure with very low potential for a major accident and/or disaster to occur. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p>
Technological or Manmade Hazards – malicious attacks	Cyber attack	X	✓	Population and human health / material asset / marine environment	<p>The Project will be managed, monitored, and operated from an onshore facility which will have remote access to the offshore electricity hub and individual FTUs. The Project will be vulnerable to cyber-attack however, the risk is no different to other windfarms operating offshore around the UK. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.</p> <p>As per the requirements of the Network and Information System (NIS) Regulations 2018, the Project will have a full and robust cyber security protocol in place prior to construction to ensure all remote access systems such as Supervisory Control and Data Acquisition (SCADA) are protected ALARP from foreseeable cyber-attacks.</p>
Technological or Manmade Hazards – malicious attacks	Infrastructure attack	X	✓	Population and human health / material asset / marine environment	<p>Malicious attacks have previously been planned or undertaken on UK national infrastructure. The Project would have minimal impact on local infrastructure and is unlikely to be considered a high profile target. In addition, it is not considered to be more vulnerable to attack than other similar infrastructure in the UK. Therefore,</p>

CATEGORY	HAZARD	SOURCE		RECEPTOR(S)	JUSTIFICATION
		INTERNAL	EXTERNAL		
					it is considered that this risk event type can be scoped out and does not require further assessment.
<b>Technological or Manmade Hazards – malicious attacks</b>	Mast and tower collapse	X	✓	Population and human health / material asset / marine environment	There are no masts or towers within 500 m of the Project. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.
<b>Technological or Manmade Hazards – workplace accidents</b>	Workplace accidents	✓	X	Population and human health / material asset / marine environment	Potential workplace accidents (e.g., industrial site accidents) will be managed through existing health and safety protocols. Therefore, possible Major Accidents and Disasters are considered to be adequately covered by existing embedded mitigation measures and compliance with legislation and best practice. Therefore, it is considered that this risk event type can be scoped out and does not require further assessment.

## 21.7 Assessment

The risk assessment has been undertaken for the Project across all phases to assess if any of the hazards identified would result in significant risk on receptors with the embedded mitigations in place. All risk events are assessed as being **tolerable** with embedded mitigation as outlined in Table 21-9. Therefore, with the implementation of embedded mitigation measures, all risks are considered to be at an acceptable level and no secondary mitigation has been identified.

Table 21-9 Assessment of vulnerability of the Project to Major Accidents and Disasters

RISK EVENT	SOURCE PATHWAY	RECEPTOR(S)	CONSEQUENCE	LIKELIHOOD	SIGNIFICANCE OF RISK	FURTHER ASSESSMENT OR MITIGATION REQUIRED
<b>External Hazards</b>						
<b>Third-party vessel or aviation collision and allision</b>	<ul style="list-style-type: none"> <li>Third-party vessels or aircraft collide with Project infrastructure or vessels.</li> <li>Increased third-party to third-party vessel collision as a result of the presence of Project infrastructure and/or vessels.</li> </ul>	<ul style="list-style-type: none"> <li>Population and human health – Project workforce, mariners and aircraft crew.</li> </ul>	<b>Serious</b> Multiple serious injuries and/or fatality	<b>Remote</b> Third-party collision with Project infrastructure has been reported in recent years, for example at Gode Wind 1 windfarm where a cargo vessel collided with a WTG in May 2023 and at an unnamed windfarm near Barrow where a fishing vessel collided with a WTG (British Broadcasting Corporation (BBC) news, 2016). However, no major injuries or damage has been reported (OffshoreWIND.biz, 2023). The risk is generally considered to be low with adequate charting and marking of infrastructure, including the FTUs and associated moorings and anchors and OSCP, and with the promulgation of information to other sea users before works (e.g. via NtMs). All FTUs will have an Automatic Identification System (AIS) installed to reduce navigational risks.  The risk of remote powered or drifting allision between third-party vessels and Project structures is remote with the implementation of embedded mitigation measures. Collision risk between third-party vessels and the Project structures and Project vessels is anticipated to be extremely unlikely and managed with embedded mitigation measures (e.g., NtMs). The greatest potential for allision is considered to result from internal	Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Material assets – third-party vessels and aircraft</li> </ul>	<b>Serious</b> Loss or damage to a single third-party vessel and/or aircraft that is critical to operations, with loss of fuel/cargo into the marine environment		Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Material assets – Project infrastructure and vessels.</li> </ul>	<b>Serious</b> Damage to FTUs, Offshore Substation Converter Platforms (OSCPs) or damage or loss of a single Project vessel to a level that is critical to operations.		Tolerable with (embedded) mitigation	No

RISK EVENT	SOURCE PATHWAY	RECEPTOR(S)	CONSEQUENCE	LIKELIHOOD	SIGNIFICANCE OF RISK	FURTHER ASSESSMENT OR MITIGATION REQUIRED
				<p>collision (i.e. vessels travelling through the Array Area). However, this will be minimised through promulgation of information and adequate lighting and marking of structures. In the event that an encounter between vessels does occur, collision avoidance action implemented by the vessels involved, in line with the COLREGs, would ensure the situation does not develop into a collision incident. Further details are available in <b>EIAR Vol. 3, Chapter 15: Shipping and Navigation</b>.</p> <p>The risk of aviation collision is also anticipated to be low with the implementation of embedded mitigation measures, such as aviation lighting and charting and issue of Notice to Airmen (NOTAM) as required. Further details are available in <b>EIAR Vol. 3, Chapter 18: Military and Civil Aviation</b>.</p>		
<b>Third-party cable snagging</b>	Fishing vessels snagging on Project IAC, Export/Import Cables and mooring lines.	<ul style="list-style-type: none"> <li>Population and human health / material asset / marine environment.</li> </ul>	<p><b>Serious</b> Multiple serious injuries and/or fatality.</p>	<p><b>Remote</b> Although fishing activity occurs in the Project Area, the risk of snagging is reduced with the implementation of embedded mitigation measures that ensure effective liaison with all fishers including the promulgation of information on the presence of safety zones and recommendations for advisory clearance distances. Furthermore, the location of Project infrastructure will be included on nautical / admiralty charts (see outline FMMS (EIAR Vol. 4, Appendix 34: <b>Outline Fisheries Management and Mitigation Strategy</b>)). The final cable design will be informed by the CBRA and will be detailed within the CaP. Cables will be buried as standard, where adequate burial depth can be achieved. Where adequate cable burial cannot be achieved, the requirement for additional cable</p>	<p>Tolerable with (embedded) mitigation</p>	No
		<ul style="list-style-type: none"> <li>Material assets - commercial fishing vessels and equipment</li> </ul>	<p><b>Serious</b> Severe damage to fishing equipment and/or vessel to a level that is critical on operation</p>		<p>Tolerable with (embedded) mitigation</p>	No
		<ul style="list-style-type: none"> <li>Material assets – Project infrastructure.</li> </ul>	<p><b>Serious</b> Damage to Project cables and mooring lines resulting in cable fault that is crucial to operations or damage to mooring lines.</p>		<p>Tolerable with (embedded) mitigation</p>	No

RISK EVENT	SOURCE PATHWAY	RECEPTOR(S)	CONSEQUENCE	LIKELIHOOD	SIGNIFICANCE OF RISK	FURTHER ASSESSMENT OR MITIGATION REQUIRED
				<p>protection will be minimised as far as practicable.</p> <p>No data was identified on reported incidents of snagging on offshore wind cables or mooring lines. However, analysis of reported snagging from the oil and gas industry indicates that the number of snagging events has reduced over the last 30 years, largely as a result of improved communication and charting. The majority of incidents (99.6%) resulted in financial loss rather than injuries or fatalities. There was only one report of injury and/or fatality between 1989 and 2016 which was the sinking of the FV Westhaven Vessel which occurred in 1998 (Rouse <i>et al.</i>, 2020).</p>		
UXO detonation	Accidental detonation of UXO.	<ul style="list-style-type: none"> <li>Population and human health – Project workforce and mariners.</li> </ul>	<p><b>Serious</b> Multiple serious injuries and/or fatality;</p>	<p><b>Extremely unlikely</b> As described in EIAR Vol. 3, Chapter 17: Marine Infrastructure and Other Sea Users, the risk of UXO is low within the Array Area and medium within the western end of the EICC. Pre-construction UXO surveys will be conducted within the Project Area to identify any pUXO (as well as other items of debris). In the event pUXO are identified through survey activity within the Array Area and/or EICC they will, where required, be subject to further investigation including target investigation with Remotely Operated Vehicle (ROV) or similar.</p>	Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Material assets – Project infrastructure.</li> </ul>	<p><b>Serious</b> Severe damage to Project infrastructure that is critical to operations.</p>		Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Material assets – third-party vessels and infrastructure.</li> </ul>	<p><b>Serious</b> Severe damage to nearby assets that is critical to operations (e.g. assets within the Madoes hydrocarbon field).</p>		Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Environment – marine species.</li> </ul>	<p><b>Moderate</b> Injury or disturbance to marine species – limited external assistance required.</p>	<p>In the event that Confirmed UXO (cUXO) are identified through this process, a hierarchy of mitigation will be applied (see embedded mitigation Section 21.6.1) UXO risk will be managed to ALARP in accordance with an ALARP certificate.</p>	Tolerable with (embedded) mitigation	No

Internal Hazards

RISK EVENT	SOURCE PATHWAY	RECEPTOR(S)	CONSEQUENCE	LIKELIHOOD	SIGNIFICANCE OF RISK	FURTHER ASSESSMENT OR MITIGATION REQUIRED
Major fires	Unexpected fire explosion (e.g., as result of electrical failure)	<ul style="list-style-type: none"> <li>Population and human health – Project workforce and Mariners.</li> </ul>	<p><b>Serious</b> Multiple serious injuries and/or fatality</p>	<p><b>Remote</b> Fire detection and protection systems will be in place to manage fire risk to ALARP and prevent the escalation of fires in the unlikely event of an occurrence. The electrical equipment will be designed in accordance with internationally recognised design standards and maintained in accordance with best practices. The highest appropriate levels of fire protection will be specified for the FTUs and OSCPs to minimise fire risks ALARP. Fault detection systems will be in place and system protection will be built into the design to limit the likelihood of any ignition source. Wind turbine fires account for 10-30% of all catastrophic turbine accidents while fire is the second leading cause of accidents in wind turbines (Fire Trace International, 2019).</p>	Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Material assets – Project vessels and infrastructure.</li> </ul>	<p><b>Serious</b> Damage or loss of Project infrastructure or a single vessel to a level that would be critical to operations.</p> <p>Flammable liquids will be stored in secure cabinets in accordance with Control of Substances Hazardous to Health (COSHH) Regulations 2022. With the hazard statistics provided and measures in place, the likelihood of an explosion or fire is remote.</p> <p>The ERCoP will contain risk assessments and protocols (e.g. evacuation plans) in the event of an emergency such as a fire and will be developed alongside the equipment Original Equipment Manufacturers (OEMs), and the MCA.</p>	Tolerable with (embedded) mitigation	No	
Project vessel or aviation collision or allision	Project vessels or helicopters collide with third-party structures or vessels as a result of equipment failure or human error.	<ul style="list-style-type: none"> <li>Population and human health – Project workforce and Mariners.</li> </ul>	<p><b>Serious</b> Multiple severe injuries and/or fatality.</p>	<p><b>Remote</b> The UK Marine Accident Investigation Branch published details of an incident of a workboat colliding with a WTG in an offshore wind farm in 2023, resulting in injuries to crew and minor damage to the vessel (MAIB, 2023).</p>	Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Material assets – third-party vessels and aircraft.</li> </ul>	<p><b>Serious</b> Loss or damage to a single third-party vessel and/or aircraft that is critical on operations with loss of fuel / cargo into the marine</p>	Tolerable with (embedded) mitigation	No	

RISK EVENT	SOURCE PATHWAY	RECEPTOR(S)	CONSEQUENCE	LIKELIHOOD	SIGNIFICANCE OF RISK	FURTHER ASSESSMENT OR MITIGATION REQUIRED
			environment that is critical to operations	Project vessels and helicopters will comply with all legislation and standard industry practice / design to reduce the potential for any equipment failure or human error. It is anticipated that all third-party structures will be adequately lit and marked, as per the embedded mitigations for the Project. In the event that an encounter between vessels does occur, collision avoidance action implemented by the vessels involved, in line with the COLREGs, would ensure the situation does not develop into a collision incident. Further details are available in EIAR Vol. 3, Chapter 15: Shipping and Navigation.		
		<ul style="list-style-type: none"> <li>Material assets – Project vessels and helicopters.</li> </ul>	<p><b>Serious</b> Damage or loss of Project infrastructure or a single vessel to a level that would be critical to operations.</p>		Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Population and human health - Project workforce and Mariners.</li> </ul>	<p><b>Serious</b> Multiple serious injuries</p>	<p><b>Extremely unlikely</b> There are recorded incidents of Floating Production Storage and Offloading (FPSO) facilities breaking free from moorings for the oil and gas industry, such as the Valaris DS-4 drillship in 2021 and there were no injuries or damage incurred (Offshore Energy, 2021).</p>	Tolerable with (embedded) mitigation	No
		<ul style="list-style-type: none"> <li>Material assets – third-party infrastructure and vessels.</li> </ul>	<p><b>Moderate</b> Damage to third-party infrastructure to a level that would not be critical to operations.</p>		Broadly acceptable	No
<b>FTU breaking free</b>	FTUs could break free from their moorings during operation or during tows.	<ul style="list-style-type: none"> <li>Material assets – Project infrastructure and vessels.</li> </ul>	<p><b>Moderate</b> Damage or loss of Project infrastructure to a level that would not be critical to operations.</p>	<p>There are no reported cases of an FTU breaking free from its moorings or during a tow. All Project infrastructure will be designed in line with internationally recognised design standards and maintained in accordance with best practices, such as the Maritime and Coastguard Agency (MCA) regulatory expectations on moorings for floating wind and marine devices (MCA, 2017), which recommends Third-Party Verification (TPV) on mooring system designs. Other requirements include continuous monitoring through the use of Global Positioning System (GPS) or other suitable means to ensure that the Marine Coordination</p>	Broadly acceptable	No

RISK EVENT	SOURCE PATHWAY	RECEPTOR(S)	CONSEQUENCE	LIKELIHOOD	SIGNIFICANCE OF RISK	FURTHER ASSESSMENT OR MITIGATION REQUIRED
				<p>Centre is alerted in the incident of a mooring failure. The ERCoP will contain risk assessments and protocols plans in the event of an emergency. Several mitigations will be in place to reduce the risk of any FTU breaking free during tow, including:</p> <ul style="list-style-type: none"> <li>• The offshore fleet supporting hook-up and station keeping will have similar capabilities as the towing vessels and can respond to support the tow;</li> <li>• The tow will be equipped with an emergency towing line which can be retrieved by the responding vessel;</li> <li>• Prior to the commencement of the tow – a suitable weather window is required for the tow to achieve sea room; and</li> <li>• The survival limits of the towed structure allow for the tow to weather harsh offshore conditions.</li> </ul>		



## 21.8 Conclusion

This chapter assesses the potential vulnerability of the Project to Major Accidents and Disasters both in terms of the potential for the Project to interact with an external Major Accident and Disaster and the potential for the Project to cause a Major Accident and Disaster. This chapter has primarily covered and assessed events deemed as low likelihood and high consequence.

All risk events are assessed as being tolerable with the implementation of embedded mitigation measures, and therefore, managed to an acceptable level. Risks from the Project will continue to be reviewed, assessed and managed, in accordance with relevant regulations, throughout the Project life-cycle.

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