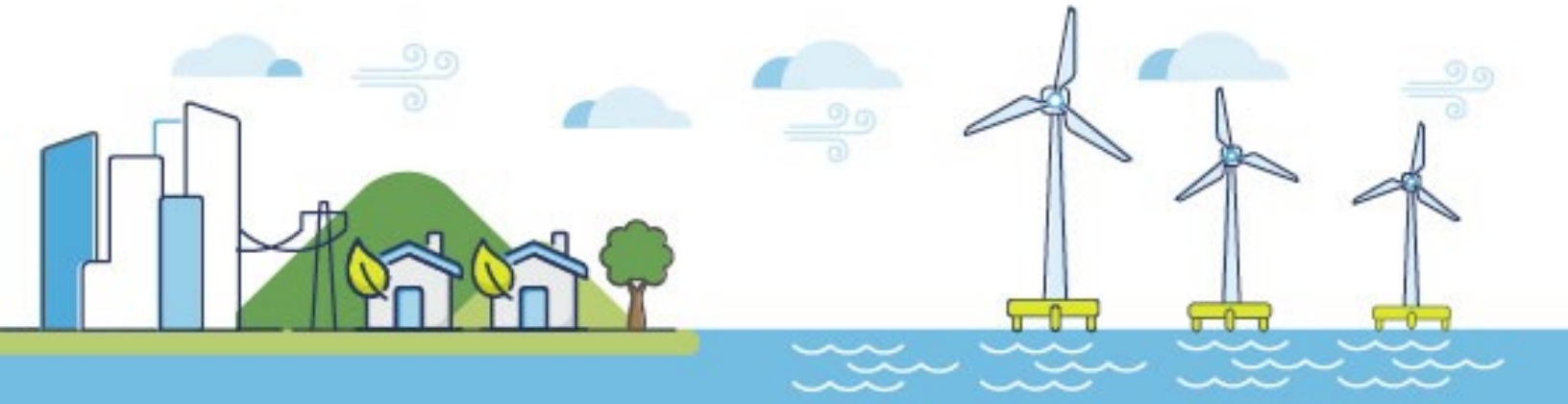
WHITE CROSS

White Cross Offshore Wind Farm Environmental Statement

Chapter 26: Accidents and Disasters



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Glossary of Acronyms

Acronym	Definition
AIS	Automatic Identification System
BEIS	Department for Business, Energy and Industrial Strategy
BGS	British Geological Society
CBRA	Cable Burial Risk Assessment
CEMP	Construction Environmental Management Plan
DECC	Department for Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
EIA	Environmental Impact Assessment
ERCoP	Emergency Response Co-operation Plan
ES	Environmental Statement
EU	European Union
GPS	Global Positioning System
ha	Hectare
HDD	Horizontal Directional Drilling
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IEMA	Institute of Environmental Management and Assessment
IMO	International Maritime Organization
IPC	Infrastructure Planning Commission
m	Metre
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
MGN	Marine Guidance Note
MMO	Marine Management Organisation
MPS	Marine Policy Statement
NPS	National Policy Statement
NRA	Navigational Risk Assessment
OWL	Offshore Wind Ltd
RYA	Royal Yachting Association
SAC	Special Area of Conservation
SAR	Search and Rescue
SOLAS	Safety of Life at Sea
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UK	United Kingdom
UKC	Under Keel Clearance

Acronym	Definition
UKHO	UK Hydrographic Office
UXO	Unexploded Ordnance
WTG	Wind Turbine Generator

Glossary of Terminology

Defined Term	Description
Applicant	Offshore Wind Limited
Department for Business, Energy and Industrial Strategy (BEIS)	Government department that is responsible for business, industrial strategy, science and innovation and energy and climate change policy and consent under Section 36 of the Electricity Act.
Environmental Impact Assessment (EIA)	Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and decommissioning.
Export Cable Corridor	The area in which the export cables will be laid, either from the Offshore Substation or the inter-array cable junction box (if no offshore substation), to the NG Onshore Substation comprising both the Offshore Export Cable Corridor and Onshore Export Cable Corridor.
Floating substructure	The floating substructure acts as a stable and buoyant foundation for the WTG. The WTG is connected to the substructure via the transition piece and the substructure is kept in position by the mooring system.
Generation Assets	The infrastructure of the Offshore Project related to the generation of electricity within the windfarm site, including wind turbine generators, substructures, mooring lines, seabed anchors and inter-array cables
Inter-array cables	Cables which link the wind turbines to each other and the Offshore Substation Platform, or at the inter-array cables junction box (if no offshore substation). Array cables will connect the wind turbines to one and other and to the Offshore Substation (if utilised). The initial section for the inter-array cables will be freely suspended in the water column below the substructure (dynamic sections) while the on seabed sections of the cables will be buried where possible.
Landfall	Where the offshore export cables come ashore
Mean high water springs	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean low water springs	The average tidal height throughout a year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest.
Mooring system	The equipment (mooring lines and seabed anchors) that keeps the floating substructure in position during operation through a fixed connection to the seabed.
Mitigation	Mitigation measures have been proposed where the assessment identifies that an aspect of the development is likely to give rise to significant environmental impacts, and discussed with the relevant authorities and stakeholders in order to avoid, prevent or reduce impacts to acceptable levels.

Defined Term	Description
	For the purposes of the EIA, two types of mitigation are defined: • Embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and form part of the project design that is assessed in the EIA • Additional mitigation: consisting of mitigation measures that are identified during the EIA process specifically to reduce or eliminate any predicted significant impacts. Additional mitigation is therefore subsequently adopted by OWL as the EIA process progresses.
Offshore Development Area	The Windfarm Site (including wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and Offshore Export Cable Corridor to MHWS at the Landfall. This encompasses the part of the project that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009
Offshore Export Cables	The cables which bring electricity from the Offshore Substation Platform or the inter-array cables junction box to the Landfall
Offshore Export Cable Corridor	The proposed offshore area in which the export cables will be laid, from Offshore Substation Platform or the inter-array cable junction box to the Landfall
Offshore Infrastructure	All of the offshore infrastructure including wind turbine generators, substructures, mooring lines, seabed anchors, Offshore Substation Platform and all cable types (export and inter-array). This encompasses the infrastructure that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009
the Offshore Project	The Offshore Project for the offshore Section 36 and Marine Licence application includes all elements offshore of MHWS. This includes the infrastructure within the windfarm site (e.g. wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and all infrastructure associated with the export cable route and landfall (up to MHWS) including the cables and associated cable protection (if required).
Offshore Substation Platform	A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore
Offshore Transmission Assets	The aspects of the project related to the transmission of electricity from the generation assets including the Offshore Substation Platform (as applicable)) or offshore junction box, Offshore Cable Corridor to MHWS at the landfall
Offshore Transmission Owner	An OFTO, appointed in UK by Ofgem (Office of Gas and Electricity Markets), has ownership and responsibility for the transmission assets of an offshore windfarm.

Defined Term	Description
Onshore Development Area	The onshore area above MLWS including the underground onshore export cables connecting to the White Cross Onshore Substation and onward to the NG grid connection point at East Yelland. The onshore development area will form part of a separate Planning application to the Local Planning Authority (LPA) under the Town and Country Planning Act 1990.
the Onshore Project	The Onshore Project for the onshore TCPA application includes all elements onshore of MLWS. This includes the infrastructure associated with the offshore export cable (from MLWS), landfall, onshore export cable and associated infrastructure and new onshore substation (if required).
Offshore Wind Limited	Offshore Wind Ltd (OWL) is a joint venture between Cobra Instalaciones Servicios, S.A., and Flotation Energy Ltd
The Project	The Project is a proposed floating offshore windfarm called White Cross located in the Celtic Sea with a capacity of up to 100MW. It encompasses the project as a whole, i.e. all onshore and offshore infrastructure and activities associated with the Project.
Project Design Envelope	A description of the range of possible elements that make up the Offshore Project design options under consideration. The Project Design Envelope, or 'Rochdale Envelope' is used to define the Offshore Project for Environmental Impact Assessment (EIA) purposes when the exact parameters are not yet known but a bounded range of parameters are known for each key project aspect.
Safety zones	A marine zone outlined for the purposes of safety around a possibly hazardous installation or works / construction area
Service operation vessel	A vessel that provides accommodation, workshops and equipment for the transfer of personnel to turbine during OMS. Vessels in service today are typically up to 85m long with accommodation for about 60 people.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water
White Cross Offshore Windfarm	Up to 100MW capacity offshore windfarm including associated onshore and offshore infrastructure
White Cross Onshore Substation	A new substation built specifically for the White Cross project. It is required to ensure electrical power produced by the offshore windfarm is compliant with NG electrical requirements at the grid connection point at East Yelland.
Wind Turbine Generators (WTG)	The wind turbine generators convert wind energy into electrical power. Key components include the rotor blades, nacelle (housing for electrical generator and other electrical and control equipment) and tower. The final selection of project wind turbine model will be made post-consent application
Windfarm Site	The area within which the wind turbines, Offshore Substation Platform and inter-array cables will be present
Works completion date	Date at which construction works are deemed to be complete and the windfarm is handed to the operations team. In reality, this may take place over a period of time.

26. Major Accidents and Disasters

26.1 Introduction

1. This chapter of the Environmental Statement (ES) presents a screening of the major accidents and disasters with the potential to occur in relation to the the White Cross Offshore Windfarm Project (the Offshore Project). Specifically, this chapter considers the potential impact of the Offshore Project seaward of Mean High-Water Springs (MHWS) during its construction, operation and maintenance, and decommissioning phases. It also outlines descriptions of the processes and measures to be implemented to ensure no significant effects arise in the event of a major accident or disaster.

2. This assessment should be read in conjunction with the following chapters:

   - **Chapter 5: Project Description**
   - **Chapter 9: Marine Water and Sediment Quality**
   - **Chapter 10: Benthic and Intertidal Ecology**
   - **Chapter 12: Marine Mammal and Marine Turtle Ecology**
   - **Chapter 14: Commercial Fisheries**
   - **Chapter 15: Shipping and Navigation**
   - **Chapter 17: Civil and Military Aviation**
   - **Chapter 18: Infrastructure and Other Users**.

3. The ES has been finalised with due consideration of pre-application consultation to date (see **Table 26.3** for comments related to this chapter and **Chapter 7: Consultation** for an overview of consultation undertaken for the Offshore Project). The ES will accompany the application to the Marine Management Organisation (MMO) on behalf of the Secretary of State for Business for The Department for Business, Energy and Industrial Strategy (BEIS) for Section 36 Consent and Marine Licenses under the Marine and Coastal Access Act 2009.

4. The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) requires significant risks to the receiving communities and environment, for example through major accidents or disasters, to be considered. Similarly, significant effects arising from the vulnerability of the Offshore Project to major accidents or disasters should be considered.

5. The following definitions are relevant to this chapter (Institute of Environmental Management and Assessment (IEMA), 2020):

- 'Major accidents' are defined as 'events that threaten immediate or delayed serious environmental effects to human health, welfare and/ or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events.' (IEMA 2020).
- A 'disaster' is a sudden accident or natural catastrophe that causes great damage or loss of life. These can be natural or can be man-made hazards (e.g. caused by accidental loss of containment) or external hazards (e.g. act of terrorism) which result in consequences for people or the environment.
- A 'receptor' refers to the specific component of the environment that could be adversely affected if the source reaches it. Environmental receptor is specifically defined as: features of the environment that are subject to assessment under Part 3 of the Marine works EIA Regulations (2007), namely *'population, human health, biodiversity (for example, fauna and flora), land (for example, land take), soil (for example, organic matter, erosion, compaction, sealing), water (for example, hydromorphological changes, quantity and quality), air, climate (for example, greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.'* For the purposes of this assessment the receptors relevant to the Offshore Project have been grouped into the following: population and human health, designated Sites (International, National and Other), scarce habitats, widespread habitats, particular species, marine environment.
- 'Serious danger to human health' relates to the people present in the potentially affected areas, either permanently or for prolonged periods of time. This excludes workers operating at the facility.
- 'Serious damage to human populations' is harm which would be considered substantial e.g., deaths, multiple serious injuries or a substantial number requiring medical attention.
- 'Serious damage to the environment' is loss or significant detrimental impact on populations of species or organisms, harm or loss of valued sites (including designated sites), valued cultural heritage sites, contamination of drinking water supplies, ground or groundwater, or permanent or long-lasting harm to environmental receptors that cannot be restored through minor clean-up or restoration efforts.
- 'As Low As Reasonably Practicable' (ALARP) is used in assessment of major accidents and disasters involves 'weighing a risk against the trouble, time and money needed to control it' noting that 'ALARP describes the level to which we expect to see risks controlled'.

26.2 Policy, Legislation and Guidance

6. **Chapter 3: Policy and Legislative Context** describes the wider policy and legislative context for the Offshore Project. The principal policy and legislation used to inform the assessment of potential impacts on major accidents and disasters for the Offshore Project are outlined in this section.

26.2.1 National Policy Statement

7. National Policy Statements (NPSs) are statutory documents which set out the government's policy on specific types of Nationally Significant Infrastructure Projects (NSIPs) and are published in accordance with the Planning Act 2008. Although the Offshore Project is not an NSIP, it is recognised that due to its size of up to 100MW and its location in English waters, certain NPS are considered relevant to the Offshore Project and decision-making and are referred to in this ES.

8. The specific assessment requirements for major accidents and disasters are set out within the overarching NPS for Energy (EN-1) as summarised in **Table 26.1**.

Table 26.1 Summary of NPS EN-1 provisions relevant to major accidents and disasters

Summary	How and where this is considered in the ES
Overarching NPS for Energy (EN-1)	
"Some energy infrastructure will be subject to the Control of Major Accident Hazards (COMAH) Regulations 1999. These Regulations aim to prevent major accidents involving dangerous substances and limit the consequences to people and the environment of any that do occur. COMAH regulations apply throughout the life cycle of the facility, i.e. from the design and build stage through to decommissioning. They are enforced by the Competent Authority comprising HSE and the EA acting jointly in England and Wales (and by the HSE and Scottish Environment Protection Agency acting jointly in Scotland). The same principles apply here as for those set out in the previous section on pollution control and other environmental permitting regimes." **– EN-1, Section 4.11, paragraph 4.11.3**	The Offshore Project is not anticipated to be considered a COMAH site because none of the hazardous substances used on site will exceed relevant COMAH thresholds.
"Applicants seeking to develop infrastructure subject to the COMAH regulations should make early contact with the Competent Authority. If a safety report is required it is important to discuss with the Competent	

Summary	How and where this is considered in the ES
Authority the type of information that should be provided at the design and development stage, and what form this should take. This will enable the Competent Authority to review as much information as possible before construction begins, in order to assess whether the inherent features of the design are sufficient to prevent, control and mitigate major accidents. The IPC should be satisfied that an assessment has been done where required and that the Competent Authority has assessed that it meets the safety objectives described above." **– EN-1, Section 4.11, paragraph 4.11.4**	

26.2.2 Other Legislation, Policy and Guidance

9. In addition to the NPS, there are a number of pieces of legislation, policy and guidance applicable to the assessment of major accidents and disasters. These are outlined within this section.

26.2.2.1 Relevant Legislation

10. The screening and assessment of major accidents and disasters has been developed with reference to the following legislation:

- Health and Safety at Work etc. Act 1974
- The Management of Health and Safety at Work Regulations 1999
- Construction (Design and Management) Regulations 2015
- Offshore Installations (Offshore Safety Directive) (Safety Cases etc.) Regulations 2015
- The Marine Works Environmental Impact Assessment) Regulations 2007 (as amended).

26.2.2.2 Relevant Guidance

11. The screening and assessment of major accidents and disasters has been developed with reference to the following guidance:

- The International Standards Organisation's ISO 31000: (2009) Risk Management – principles and guidelines;
- Institute of Environmental Management and Assessment (IEMA) (2016). EIA Quality Mark Article: Assessing Risks of Major Accidents/Disasters in EIA;
- IEMA (2020). Major Accidents and Disasters in EIA: A Primer
- IEMA (2017). EIA Quality Mark Article: What is this MADness?

- Guidelines for Environmental Risk Assessment and Management Green Leaves II, (2011), prepared by Defra and the Collaborative Centre of Excellence in Understanding and Managing Natural and Environmental Risks, Cranfield University
- Health and Safety Executive (2015). Control of Major Accident Hazards (COMAH) Regulations
- Health and Safety Executive (2015). Offshore Major Accident Regulator (OMAR) guidance on The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015.

26.2.2.3 Relevant Policies

12. The screening and assessment of major accidents and disasters has been developed with reference to the following policy:

- The Civil Contingencies Act 2004 ("the Act")
- The UK Marine Policy Statement ("the MPS") (Department for Environment, Food and Rural Affairs, 2011)
- The National Planning Policy Framework (as described below)
- Electricity at Work Regulations 1989 (No. 635)
- European Union (EU) Regulation 402/2013 on the Common Safety Method on Risk Evaluation and Assessment (CSM-RA) (as amended by Regulation EU 2015/1136)
- EU Regulation 2014/52 Directive on the Assessment of the Effects of Certain Public and Private Projects on the Environment
- The Planning (Hazardous Substances) Regulations 2015
- Control Of Major Accident Hazards (COMAH) Regulations 2015
- Infrastructure Planning (Environmental Impact Assessment Regulations) 2017
- Seveso III Directive 2015.

26.2.2.3.1 National Planning Policy Framework

13. The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, updated July 2021) is the primary source of national planning guidance in England. Sections relevant to this aspect of the ES are summarised below in **Table 26.2**.

Table 26.2 Summary of NPPF Policy relevant to major accidents and disasters

Summary	How and where this is considered in the ES
"Local planning authorities should consult the appropriate bodies when considering applications for the siting of, or changes to, major	**Section 26.3** presents the

Summary	How and where this is considered in the ES
hazard sites, installations or pipelines, or for development around them." **– NPPF, Paragraph 45**	stakeholder consultation. **Section 26.4.2.3** presents the baseline and **Sections 26.5** present the assessment and consideration of embedded mitigation measures. Further details on mitigation to reduced navigational risk are also provided in **Table 26.7.** Further embedded mitigation is set out within the relevant ES chapters.
'Planning policies and decisions should promote public safety and take into account wider security and defence requirements by: • anticipating and addressing possible malicious threats and natural hazards, especially in locations where large numbers of people are expected to congregate. Polices for relevant areas (such as town centre and regeneration frameworks), and the layout and design of developments, should be informed by the most up-to-date information available from the police and other agencies about the nature of potential threats and their implications. This includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security; and • recognising and supporting development required for operational defence and security purposes, and ensuring that operational sites are not affected adversely by the impact of other development proposed in the area." - **Paragraph 97**	
"Planning policies and decisions should ensure that: a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation); b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and c) adequate site investigation information, prepared by a competent person, is available to inform these assessments." **– NPPF, Paragraph 183**	

26.3 Consultation

14. Consultation has been a key part of the development of the Offshore Project. Consultation regarding major accidents and disasters has been conducted throughout the EIA. An overview of the project consultation process is presented within **Chapter 7: Consultation**.

15. A summary of the key issues raised during consultation specific to major accidents and disasters is outlined below in **Table 26.3**, together with how these issues have been considered in the production of this ES.

Table 26.3 Consultation responses

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
Marine Management Organisation	Scoping Opinion, 2022	The MMO does not consider that sufficient information has been presented within the Scoping Report to conclude that there would be no likely significant effects from other potential major accidents and disasters, both in respect of the vulnerability of the proposed Development to these or for the Proposed Development to cause them. The results of the review exercise completed by the Applicant should be presented in the ES. This should include a description of the sources of hazards and pathways that have been considered as part of the review process and why these have been discounted. Where likely significant effects are identified, these should be assessed in the ES. In this regard, the MMO notes that there is potential for wartime UXO to be located within the offshore scoping area and no information has been presented about their locations and potential for accidental detonation and associated impacts that could lead to a major accident or disaster. In addition, the potential for cumulative effects arising from major accidents and disasters in terms of inter relationships with other aspects of the Proposed Development and other projects should be considered, and	As a result of the MMO's comments, a Major Accidents and Disasters chapter has been produced in line with the available guidance. This assessment includes natural disasters, avalanche, flooding, drought, extreme temperatures, fires, storms, air quality, biological disasters, industrial action and accidents, public disorder, war (including terrorist attacks), noxious substances and electrical failures. Details of whether each of these parameters has been scoped in or out of the assessment are discussed in **Section 26.5.1**. Details of existing baseline environment, which include the parameters discussed above, are discussed in **Section 26.4.2.3**. Potential hazards associated with each of the phases of the Offshore Project are discussed in **Sections 26.5.** Disturbance of Unexploded Ordnance (UXO) in Offshore Project area is scoped in to this assessment and presented in **Section 26.5.3.6.** Furthermore, a UXO Risk Assessment will be undertaken for the Project pre-construction.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		where significant effects are likely to occur, these should be assessed within the ES.	Cumulative effects arising from major accidents and disasters in terms of inter relationships with other aspects of the Proposed Development and other projects are presented in the individual chapters within this ES. Embedded mitigation, design and impact avoidance measures will be implemented for the construction, operation and decommissioning phases of the Offshore Project.
		Section 4.5.3 of the Scoping Report sets out the Applicant's proposed approach to the assessment of major accidents and disasters. It is stated that following a review of potential major accidents and disasters, a number of matters are proposed to be scoped into the ES as part of other aspect chapters, including coastal erosion and flood risk, accidental spills of hazardous materials, vessel collision and exposed cables leading to vessel snagging. The MMO agrees that these matters should be scoped into the ES.	
Natural England	Coastal Geomorphology Expert Topic Group (ETG) and associated email correspondence, 2023	Concerns were raised by Natural England with regards to the potential for adverse effects to the Taw-Torridge Estuary SSSI during the trenchless crossing below the estuary. Specific concerns relate to: • Exit pits being located within designated sites • The potential for sink holes occurring within unconsolidated layers resulting in Bentonite breakout negatively impacting the SSSI	The concerns raised by Natural England are addressed within **Chapter 5 Appendix 5.B: Outline Taw Estuary Crossing Construction Method Statement.** This document provides further details of the proposed trenchless techniques likely to be used (HDD or Direct Pipe) and the depth of the crossing below the estuary bed. It outlines the location of entry and exit pits (which will be located outside the boundary of the Taw-Torridge Estuary SSSI). It provides a summary of desk-based geotechnical analysis of historical boreholes. that has been undertaken and will also outline geotechnical investigation to be undertaken prior to construction.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
			The Applicant will undertake further consultation with Natural England (and the MMO) in advance of the commencement of construction and pre-construction geotechnical investigation.

26.4 Assessment Methodology

16. For the assessment of major accidents and disasters within EIA there is no standard methodology, however, IEMA have prepared a 'Major Accidents and Disasters in EIA: A Primer (IEMA, 2020) which provides guidance on a risk-based approach. This screening assessed the likelihood of the significant threat or hazard occurring, and the mitigation embedded to ensure a risk is 'As Low As Reasonably Practicable' (ALARP) or avoided completely. The risks were identified in respect to the potential vulnerability of the Offshore Project to disaster risks, and the potential of the Offshore Project to cause major accidents. The assessment methodology outlined above for major accidents and disasters therefore differs with that presented in in **Chapter 6: EIA Methodology**.

17. The following steps were undertaken during the site-specific risk assessment:

- Stage 1: Identify the hazards in a long list of possible major accidents and disasters. Major accidents or disasters with little relevance to the Offshore Project were not included (e.g. avalanches). This stage also involved the identification of the receptors in the existing environment.
- Stage 2: Screening exercise to determine which risks are relevant to the Offshore Project and required further assessment.
- Stage 3: Risk evaluation – definition of the potential impacts that may occur from the risks and classification of the likelihood that the events may occur. Identification and evaluation of prevention, minimisation and/or mitigation measures.
- Stage 4: Determination of whether the risk has been mitigated ALARP and the identification of any residual risk, and the consequences upon the receptors in the event of a major accident or disaster.

26.4.1 Risk evaluation

18. Major accidents and disasters, by definition are those with the potential to have serious consequences for the receptors affected. The thresholds of what constitutes a major accident or disaster varies by receptor, and the definitions of the thresholds for the relevant receptors is provided in **Table 26.4**.

19. The likelihood of a serious event occurring is examined when determining whether a hazard constitutes a major accident or disaster. Events of high consequence with a high likelihood of occurring are determined to be high risk and are unacceptable for any development and are designed out (an example may be infrastructure that did not comply with design codes causing a major failure). These are therefore outside

the scope of this assessment. Low impact events which do not meet the criteria listed in **Table 26.4** are not considered a major accident or disaster and are therefore outside of the scope of this assessment.

20. The assessment therefore will focus largely on low likelihood, but potentially high consequence events. Events relating to a planned or known activity, such as noise and vibration from piling, are covered within relevant chapters of the ES, where assessment of the impacts and mitigation is provided. This chapter will identify potential low likelihood, high consequence events with the potential to occur in the Offshore Project area that may be determined to constitute a major accident or disaster. It also sets out the Offshore Projects embedded and additional mitigation in place and assess whether identified impacts have been reduced ALARP or avoided.

26.4.2 Scope

26.4.2.1 Study Area

21. The major accidents and disasters study area is defined by the distance over which impacts on identified receptors from all offshore infrastructure (i.e. Windfarm Site, Offshore Substation, Offshore Export Cable Corridor, Landfall and Taw Estuary Crossing) may occur and by the location of any receptors that may be affected by those potential impacts. Details of the location of the Offshore Project and the offshore infrastructure are set out within **Chapter 5: Project Description.**

22. Direct overlap of activities is limited to the Windfarm Site and a 50km zone of influence for direct and indirect interaction with a wide range of other offshore users. The study area for major accidents and disasters is illustrated in **Figure 26.1**.

Figure 26.1 Major Accidents and Disasters study area

26.4.2.2 Potential Receptors

23. The potential receptors relevant to this screening and assessment are provided with definitions in **Table 26.4**. The level of harm considered to represent a major accident or disaster is also presented. The thresholds have been determined using industry best practice based upon a) criteria for notification of a major accident to the European Commission under Article 18(1) of Seveso III Directive[1] and Regulation 26 of the COMAH Regulations 2015 (citied in IEMA, 2020) and b) The control of Major Accident Hazards Regulations 2015.

[1] The Seveso III Directive (Directive 2012/18/EU) is the main EU legislation dealing specifically with the control of onshore major accident hazards involving dangerous substances.

Table 26.4 Potential Receptors requiring consideration for major accidents and disasters

Receptor group	Receptors included	Major accident or disaster threshold
Human health	Recreational and third-party commercial sea users (including shipping or fisheries) Construction workers, operation and maintenance workers. The human health baseline is detailed in **Chapter 23: Socio-Economics (including Tourism and Recreation)** and **Chapter 24: Human Health**.	For the public: • Substantial number (5+) of people requiring medical attention or any serious/life-changing injuries. Potential for localised interruption to utilities and damage to infrastructure. For workers: • Multiple life changing injuries or fatalities.
Designated Sites (International, National and Other)	Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar Sites, Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Marine Conservation Zones (MCZ), National Parks, Environmentally Sensitive Areas, Areas of Outstanding Natural Beauty, Local Nature Reserves, Local Wildlife Sites also known locally as County Wildlife Site, Sites of Importance for Nature Conservation, and Sites of Nature Conservation Importance. Ecologically sensitive sites are detailed in **Chapter 10: Benthic and Intertidal Ecology**, **Chapter 11: Fish and Shellfish Ecology**, **Chapter 12: Marine Mammal and Marine Turtle Ecology** and **Chapter 13: Offshore Ornithology**. Designated sites located within the Offshore Project study area: • Braunton Burrows SAC and SSSI	For NNRs, SSSIs, MNRs, the thresholds are: • Greater than 0.5 ha adversely affected, or greater than 10% of the area of the site affected (whichever is the lesser), or • Greater than 10% of an associated linear feature adversely affected, or • Greater than 10% of a particular habitat or population of individual species adversely affected. For SACs, SPAs, and Ramsar sites, the thresholds are: • Greater than 0.5 ha or 5% of the area of the site adversely affected (whichever is the lesser), or Greater than 5% of an associated linear feature adversely affected, or • Greater than 5% of a particular habitat or population of individual species adversely affected. For other designated land the threshold is: • Greater than 10% or 10 ha of land damaged, whichever is the lesser.

Receptor group	Receptors included	Major accident or disaster threshold
	• Taw-Torridge Estuary SSSI • Bideford to Foreland Point Marine Nature Reserve (MNR) • Hartland Point to Tintagel Marine Conservation Zone (MCZ) • Morte Platform MCZ • South West Approaches to Bristol Channel MCZ • North West of Lundy MCZ • Lundy MCZ	
Scarce Habitats	Biodiversity Action Plan habitats and Habitats of Principal Importance	Damage to 10% of the area of the habitat or 2 hectares, whichever is the lesser.
Widespread habitat	Waters used for fishing or aquaculture	Contamination of any aquatic habitat which prevents fishing or aquaculture or which similarly renders it inaccessible to the public
Particular species	Particular species covers all species, both flora and fauna, found in the UK and includes common species, red data book species and other protected or priority species, including rare species.	• For common species, where reliable estimates of population numbers exist, the death of, or serious sub-lethal effects within, 1% of any species would be significant. • For common plant species, the death of, or serious sub-lethal effects within, 5% of the ground cover would be considered a major accident. • For species listed in the Habitats directive annexes, the Annexes of the Birds directive, the schedules of the Wildlife and countryside Act 1981 (and amendments), all Red Data Book species and priority species under the UK biodiversity Action Plan, the threshold may be lower than 1% or 5%, and liaison with the appropriate statutory conservation organisation

Receptor group	Receptors included	Major accident or disaster threshold
		should be used to determine the appropriate threshold. Moreover, for all species, where reliable estimates of population numbers do not exist, liaison with the statutory authority will be necessary to determine appropriate thresholds. Any loss of a Red Data Book species (or a Red Data Book species site).
Marine environment	Non-estuarine marine waters, sub-littoral zones, benthic community adjacent to the coast and fish spawning grounds. The receptors considered for surface waters are detailed are detailed within **Chapter 9: Marine Water and Sediment Quality**. The Offshore Project is located within the Outer Bristol Channel. However, the Export Cable crosses underneath the Taw Estuary water body using trenchless technology (such as HDD or Direct Pipe).	Permanent or long-term damage to ▪ An area of 2 ha or more of the littoral or sub-littoral zone, or the coastal benthic community, or the benthic community of any fish spawning ground, or ▪ An area of 100 ha or more of the open sea benthic community. Or a count of ▪ 100 or more dead sea birds (not gulls), or ▪ 500 dead sea birds of any species, or ▪ 5 dead or significantly injured/impaired sea mammals of any species.

26.4.2.3 Data Limitations

24. This assessment is based on the design as set out in **Chapter 5: Project Description**. There were no limitations affecting this assessment.

25. The assessment is also dependent on information from other technical assessments within the ES which utilise third part data, as well as information from other sources. The third party information is taken at face value and no further check or validation of this information has been made.

26.4.3 Existing Environment

26.4.3.1 Current Baseline

26. The existing environment for the Offshore Project has been characterised within the previous chapters of this report. The descriptions contained within previous chapters are representative of the environment that may potentially be impacted by hazards scoped into this chapter (see **Table 26.5**). To avoid repetition please refer to the following chapters:

- **Chapter 8: Marine geology, Oceanography and Physical Processes**
- **Chapter 9: Marine Water and Sediment Quality**
- **Chapter 10: Benthic and Intertidal Ecology**
- **Chapter 11: Fish and Shellfish Ecology**
- **Chapter 12: Marine Mammal and Marine Turtle Ecology**
- **Chapter 13: Offshore Ornithology**
- **Chapter 14: Commercial Fisheries**
- **Chapter 15: Shipping and Navigation**
- **Chapter 16: Marine Archaeology and Cultural Heritage**
- **Chapter 17: Civil and Military Aviation**
- **Chapter 18: Infrastructure and Other Users**
- **Chapter 19: Offshore Seascape, Landscape and Visual Amenity**
- **Chapter 20: Onshore Ecology and Ornithology**
- **Chapter 21: Noise and Vibration**
- **Chapter 22: Traffic and Transport**
- **Chapter 23: Socio-Economics (including Tourism and Recreation)**
- **Chapter 24: Human Health**
- **Chapter 25: Climate Change**.

26.4.3.2 Do Nothing Scenario

27. The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) require that "an outline of the likely evolution thereof without

implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge" is included within the ES (EIA Regulations, Schedule 4, Paragraph 3). From the point of assessment, over the course of the development and operational lifetime of the Project (operational lifetime anticipated to be a minimum of 25 years), long-term trends mean that the condition of the baseline environment is expected to evolve. This section provides a qualitative description of the evolution of the baseline environment, on the assumption that the Offshore Project is not constructed, using available information and scientific knowledge of major accidents and disasters.

28. The do nothing scenario, or future baseline, for the Offshore Project relevant to major accidents and disasters will evolve relating to several likely factors over the Offshore Project lifecycle. Climate change is likely to lead to changes in rainfall and temperature, increased occurrences of extreme weather, and rising sea levels. Predictions for changes in climate until the end of the 21st century are available from The UK Climate Projections (UKCP, 2021). The impacts of climate change are set out in more detail in **Chapter 25: Climate Change**.

29. There are likely to be advances in technology over the lifetime of the Offshore Project, with potential for further reductions in risks to safety and the environment, or to introduce new hazards with the introduction of novel technology. Novel technologies would be implemented following appropriate risk assessment processes.

26.4.3.3 Worst-Case Scenario

30. In accordance with the assessment approach to the Project Design Envelope, or 'Rochdale Envelope', set out in **Chapter 6: EIA Methodology**, the impact assessment for major accidents and disasters has been undertaken based on a realistic worst-case scenario of predicted impacts. The relevant technical chapters to this assessment detail the worst-case scenario for each topic.

31. The Project Design Envelope for the Offshore Project is detailed in **Chapter 5: Project Description**.

26.5 Screening and Assessment of Major Accidents and Disasters

26.5.1 Stage 1

32. This section describes long list of hazards with the potential to cause major accidents and disasters during the lifetime of the Offshore Project. This has been based upon

consideration of the baseline environment, the project description outlined in **Chapter 5: Project Description**, and the Scoping Opinion, potential impacts upon major accidents and disasters have been identified and scoped in or out of the EIA. These impacts are outlined, together with a justification for why they are or are not considered further, in **Table 26.5** and **Table 26.6** respectively.

33. Also included in the assessment are instances where the Offshore Project increases the probability of a hazard occurring, or where the consequences of a hazard may be exacerbated by the Offshore Project. Risks were identified using the National Risk Register, professional judgement, and a review of available literature. In relation to Shipping and Navigation, a Hazard Workshops were held in July and August 2022, stakeholders that participated were as follows:

- Fisheries Hazard Workshop:
  - North Devon Fishermen's Association
  - Cornish Fish Producer's Organisation
- Regulatory and Commercial Hazard Workshop:
  - Maritime and Coastguard Agency
  - Trinity House
  - Chamber of Shipping
  - Milford Haven Port Authority
- Cable Landfall Hazard Workshop:
  - Bideford Harbour Master.

26.5.1.1 Scoped In

Table 26.5 Summary of impacts scoped in relating to major accidents and disasters

Potential Impact	Justification
Major Accidents	
Major fires	A major fire may lead to serious damage to the environment through harmful emissions to air and sea, and create a localised fire hazard, however the location away from populated areas limits the scale of impact.
Project Specific Hazards	
Exposed cables leading to vessel snagging	Event could lead to immediate and likely irreparable damage to the marine environment. Risk of loss of life and damage to Offshore Project infrastructure and other marine users.
Vessel interactions (e.g. collision, allision)	Event could lead to immediate and likely irreparable damage to the marine environment. Risk of loss of

Potential Impact	Justification
	life and damage to Offshore Project infrastructure and other marine users.
Aviation collision	Risk of loss of life and damage to Offshore Project infrastructure and other marine users.
Accidental spills of hazardous material	The impacts would relate to the scale of the spill and the type of hazardous material. Only large scale spills with the potential to cause considerable damage to the environment is scoped in for further assessment.
Disturbance of Unexploded Ordnance (UXO) in Offshore Project area	Risk of loss of life and damage to infrastructure.
Floating Wind Turbine Generator (WTG) breaking free during tow or from moorings	Risk of loss of life and damage to Offshore Project infrastructure and other marine users.
Workplace accident (on vessel, within Wind Farm)	Risk of loss of life and damage to Offshore Project infrastructure and other marine users.

26.5.1.1 Scoped Out

Table 26.6 Summary of impacts scoped out relating to major accidents and disasters

Potential Impact	Justification
Environmental hazards	
Coastal flooding	The Offshore Project will be located within a marine environment and would not impact on coastal flooding.
Coastal erosion	Cables will be buried to a sufficient depth during operation to prevent them from becoming exposed in the nearshore area. The worst case is open trenching to bury two cables across the entire width of Saunton Sands. The trench would be excavated to a depth of 1.2m (volume of 162m^3 for two cables) with a mechanical digger over an indicative period of up to 24 hours. Due to the short-term nature of the construction activity at Landall (approx. 2 days) and the long-term (14 years) low rates of vertical change of the beach at the Landfall (0-36mm/year) means that changes to the beach would be low and temporary. After installation of the cables, the trench would be backfilled, returning the beach to its original morphology. The return of the beach to its pre-construction morphology means that short-term

Potential Impact	Justification
	changes in the form and function of the coast arising from cable installation would not be significant. Hence, the overall significance of the effect under a worst case scenario on the identified morphological receptor is deemed negligible adverse and is therefore scoped out of this chapter.
River flooding	The Offshore Project will be located within a marine environment and would not impact on river flooding.
Surface water flooding	The Offshore Project will be located within the marine environment and would not impact on flood defences or flood risk.
Low temperatures	The project design will consider the effect of low temperatures. However, an event would have minimal interaction with the Offshore Project.
Hurricanes and storms	Damage to infrastructure from severe weather is unlikely to result in hazards with significant risk. In cases where infrastructure is damaged and turbine blades are lost to sea, this is considered unlikely to cause injury.
Poor air quality	Event would have negligible consequence on the Offshore Project.
Drought	The Offshore Project would have a low vulnerability to drought conditions.
Wildfires	The Offshore Project would have a low vulnerability to wildfires.
Environmental disasters overseas	The Offshore Project would have low vulnerability to environmental disasters overseas.
Severe space weather	Space weather is monitored and therefore can be forecast similar to other weather events. This allows for mitigation to be put into place before any effects are felt.
Earthquake	The likelihood of occurrence is considered to be low as the site is located within an area of low seismicity.
Tsunami	The Offshore Project is not located within an identified tsunami risk zone. The likelihood of occurrence is low and potential future changes to the baseline are also low.
Human and Animal Health	
Infectious disease epidemics and pandemic	The Offshore Project would have a low vulnerability to infectious disease epidemics and pandemics.

Potential Impact	Justification
Infectious animal disease epidemics and pandemics	The Offshore Project would have a low vulnerability to infectious animal disease epidemics and pandemics.
Antimicrobial resistance	The Offshore Project would have low vulnerability to antimicrobial resistance.
Major Accidents	
Widespread electricity failure and infrastructure failures	The Offshore Project would have a low vulnerability to commercial failures.
Commercial failures	The Offshore Project would have a low vulnerability to commercial failures.
Systematic financial crisis	The Offshore Project would have a low vulnerability to systematic financial crisis.
Industrial accidents – nuclear	The Offshore Project would have a low vulnerability to nuclear industrial accidents.
Societal Risks	
Public disorder and civil unrest	The Offshore Project would have a low vulnerability to public disorder or civil unrest.
Industrial action	The risk of industrial accidents in the vicinity of the Offshore Project is considered unlikely.
Malicious Attacks	
Attacks on publicly accessible locations, infrastructure and transport	The Offshore Project is no more vulnerable to this type of hazard than any other development
Conflict and wars (including terrorist attack)	The Offshore Project would have a low vulnerability to conflict and wars.
Cyber-attacks	Cyber-attack is unlikely to affect the Offshore Project, however cyber security measures would be put in place and kept up to date to defend against cyber-attack.
Small, medium and large-scale Chemical, Biological, Radiological and Nuclear (CBRN) attacks	The Offshore Project would have a low vulnerability to all CBRN attacks.
Undermining the democratic process	The Project is no more vulnerable to this type of hazard than any other development
Serious and Organised Crime	
Serious and organised crime – vulnerabilities, property and commodities	The Offshore Project would have a low vulnerability to serious and organised crimes.
Project Specific Hazards	

Potential Impact	Justification
Seabed conditions affecting foundations	Pre-construction survey will ensure that seabed conditions are suitable for foundations / anchors.

26.5.2 Stage 2

34. Hazards from the longlist in **Table 26.5** considered for further assessment are:

- Major Accidents:
  - Major fires
- Project Specific Hazards:
  - Exposed cables leading to vessel snagging
  - Vessel interactions (e.g. collision, allision)
  - Aviation collision
  - Accidental spills of hazardous material
  - Disturbance of UXO in Offshore Project area
  - Floating WTG breaking free during tow or from moorings
  - Workplace accident (on vessel, within Wind Farm)

26.5.3 Stage 3

35. This stage requires definition of the potential impacts that may occur from the risks and classification of the likelihood that the events may occur. Mitigation measures for each hazard are considered. Several of the hazards identified are already covered in previous chapters of this ES, details of which are provided in the following sections.

26.5.3.1 Major fires

36. This hazard would likely only be limited to the Windfarm Site. The risk of Offshore Substation Platform (OSP) or WTG fires is low. However, fires can impact the supply of electricity and create a localised fire hazard. The highest appropriate levels of fire protection and resilience will be specified for the substation to minimise fire risks ALARP. The small quantities of lubricants, fuel and cleaning equipment required within the OSP and WTGs will be stored in suitable facilities designed to the relevant regulations and policy design guidance. As outlined in the **Appendix 5.A: Outline Construction Environmental Management Plan** (CEMP), Emergency Response Plans will be developed following discussions with the Maritime and Coastguard Agency, including risk assessments and designated evacuation plans for workers on board in the unlikely event of fire breaking out. Given the Offshore Project's offshore location limiting access to the public, and preventing fires from spreading, including mitigation the risk of the consequences meeting the threshold for the applicable receptors is considered to be ALARP.

26.5.3.2 Exposed cables leading to vessel snagging

37. This hazard is relevant to the Offshore Development Area including Windfarm Site and Offshore Export Cable Corridor. The impacts, mitigation and evaluation of the residual risk resulting from this hazard are discussed in the Offshore ES in **Chapter 15: Shipping and Navigation**.

38. **Appendix 8.C: Cable Burial Risk Assessment** sets out the installation methods that will used to mitigate environmental and navigational issues. The Offshore Project will use cabling burial techniques, where possible, for both the inter-array cable and offshore export cables. This will enable a reduction in the potential for interactions between other marine users and the deployed cabling infrastructure associated with the Offshore Project. This is particularly important to enable the continuation of fishing activities in the locations where the cabling infrastructure has been buried. The Project will seek cable crossing agreements with other existing cable operators where a cable crossing is required. The Offshore Project will comply with all cabling industry standards in locations where the Offshore Project cabling infrastructure will be buried. Cable protection will be monitored as per cable suppliers' recommendations, and in agreement with power purchase customers. Further information on the intended pre-construction campaigns is outlined in the Offshore EIA Report in **Chapter 5: Project Description**. The risk of this hazard occurring is considered to be ALARP.

26.5.3.3 Vessel interactions (e.g. collision, allision)

39. This hazard is relevant to the Offshore Development Area including Windfarm Site and Offshore Export Cable Corridor. The impacts, mitigation and evaluation of the residual risk is discussed in **Chapter 15: Shipping and Navigation** and **Chapter 18: Infrastructure and Other Users** which also discusses the risk that the increased vessel movement to and from the site may pose to navigational safety during construction and operational phases, and further detail is provided in the Navigational Risk Assessment (NRA) (**Appendix 15.A**).

40. Site selection process undertaken as part of the development of the Offshore Project avoided significant interactions with existing marine infrastructure in the Offshore Development Area. This has been undertaken through a combination of consultation, desk-based research and offshore surveys. This will reduce the potential of the Offshore Project's infrastructure interfering with existing marine infrastructure. A further detailed analysis of this site selection process has been provided in **Chapter 4: Site Selection and Assessment of Alternatives**.

41.

42. **Table** 26.7 outlines the embedded mitigation which has been incorporated into the design of the Offshore Project to reduce navigational risk.

Table 26.7 Embedded mitigation measures to reduce navigational risk

Component/Activity	Mitigation embedded into the design of the Offshore Project
Cable Burial	Minimum cable burial depth of 0.5 m, with a maximum burial depth of 3m. The use of cable burial will prevent snagging with fishing gear.
Post-lay and cable burial inspection	Undertaking of post-lay and cable burial inspection to confirm the burial status of the cables, identify potential seabed hazards associated with installation, and, where appropriate and practicable, undertaking of rectification works.
Notice to Mariners	To ensure that the appropriate authorities are informed of works being carried out in waters adjacent to the Offshore Project. To include: • UK Hydrographic Office (UKHO) • Maritime and Coastguard Agency (MCA) • Kingfisher • Trinity House (TH) • Royal Yachting Association (RYA) • Local Ports and Harbours • Oil and Gas Operators • MMO.
Site Marking and Charting	Site is marked on nautical charts including an appropriate chart note.
Safety Zone	Application and use of safety zones of up to 500m from platform edge (at sea level) during construction/major maintenance and decommissioning phases. Safety zones shall be of appropriate configuration, extent and application to specified vessels of identified primary risk of sub-sea equipment to fishing and snagging hazard.
Emergency Response Co-Operation Plan (ERCoP)	ERCOP will be prepared with agreement of the MCA.
Periodic Exercises	Periodic emergency management and response exercises will be run by the Applicant, in conjunction with the Coastguard Operations Centre (CGOC) / Search and Rescue (SAR).
Incident Investigation and Reporting	There are statutory incident reporting requirements and expectations: • Marine Accident Investigation Branch (MAIB) (Merchant Shipping Act) • HSE (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)) • Harbour Authority under Port Marine Safety Code.

Component/Activity	Mitigation embedded into the design of the Offshore Project
	• Risk assessments to be reviewed following incidents, and additional risk controls identified if appropriate.
Aids to Navigation	Suitable Aids to Navigation (AtoN) lighting and marking the offshore wind farm (OWF) site shall be undertaken complying with the International Association of Marine Aids to Navigation and Lighthouse Authorities' (IALA) Recommendations G1162 (IALA, 2021), to be finalised and approved in consultation with MCA and TH through an Aids to Navigation Management Plan. Fog horns to alert vessels to the position of structures when visibility is poor. Note planned update to O-139 to include painting reference from waterline (not highest astronomical tide (HAT)). WTG informal naming/associated markings shall not interfere with formal AtoN's. Automatic Identification System (AIS) transponders to be placed on periphery corner WTGs
Buoyed Construction Area	Buoys deployed around construction work in windfarm site in line with Trinity House Lighthouse Service (THLS) requirements and may include a combination of cardinal and/or safe water marks. To be finalised and approved in consultation with MCA and THLS through an Aids to Navigation Management Plan.
Marine Operating Guidelines	Project vessels during construction and co-ordination during O&M to ensure project vessels do not present unacceptable risks to each other or third parties. Project marine traffic coordination plans to be made available to all maritime users. Information and warnings will be distributed via Notices to Mariners and other appropriate media (e.g. Admiralty Charts and fishermen's awareness charts) to enable vessels and operators to navigate around the windfarm site and activities effectively and safely during the Offshore Export Cable Corridor construction.
Guard Vessels	Provision of guard vessel in vicinity of windfarm site during construction or major maintenance to monitor third-party vessel traffic and intervene with warnings as necessary.
Compliance with International, UK and Flag State Regulations inc. the International Maritime Organisation (IMO) Conventions	Compliance from all vessels associated with the proposed project with international maritime regulations as adopted by the relevant flag state (e.g. International Convention for the Prevention of Collision at Sea (COLREGS) (IMO, 1972) and International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974)
Vessel health and safety requirements	As industry standard mitigation, the Applicant will ensure that all project related vessels meet both IMO conventions for safe operation as well as HSE requirements, where applicable. This shall include the following good practice: • Windfarm associated vessels will comply with international maritime regulations

Component/Activity	Mitigation embedded into the design of the Offshore Project
	• All vessels, regardless of size, will be required to carry AIS equipment on board • All vessels engaged in activities will comply with relevant regulations for their size and class of operation and will be assessed on whether they are appropriate for activities they are required to carry out • All marine operations will be governed by operational limits, tidal conditions, weather conditions, and vessel traffic information • Walk to work solutions will be utilised where relevant.
Pre-construction surveys	Pre-construction surveys will be implemented by the Offshore Project in order to identify any potential hazards within the Windfarm Site. These will include geophysical surveys to identify seabed hazards and magnetometer surveys to identify existing subsea cable locations and for the presence of UXO devices. Any identified UXO devices would be avoided through micro-siting or require a subsequent UXO clearance campaign.

26.5.3.4 Aviation collision

43. Mitigation to avoid impacts upon aviation receptors is discussed in **Chapter 16: Aviation and Radar**. This mitigation incorporates:

- Notification to aviation stakeholders
- Regularity of layout, aviation lighting and marking
- Mitigation for construction (including towing of turbines and lighting of construction plant)
- Compliance with requirements for SAR.

44. With the agreement and implementation of suitable mitigation the risk is considered ALARP.

26.5.3.5 Accidental spills of hazardous material

45. During construction, operation and maintenance and decommissioning the use of fuels will be required and some chemicals may be required on board vessels involved. This hazard is relevant to the Offshore Development Area including Windfarm Site and Offshore Export Cable Corridor.

46. The Applicant will commit to undertaking construction works in adherence will all relevant best practice guidance and legislation and will prepare all necessary plans in advance of construction activities. As such, the impact of pollution due to leaks and spills from other vessels or other plant equipment was scoped out of the EIA, as agreed by the MMO in the Scoping Opinion (Case reference: EIA/2022/00002), as

discussed in **Chapter 9: Marine Sediment and Water Quality**. Where there is the potential for an accidental spill or leak, the focus will be on control measures that would be employed to reduce accidental releases to the environment. To ensure these are captured and implemented, the Outline CEMP (**Appendix 8.A**) will be developed prior to construction. The CEMP will include measures for planning for accidental spills, address all potential contaminant releases and include key emergency contact details.

47. A Marine Pollution Contingency Plan (MPCP) will also be developed post-consent. The MPCP will detail the management measures to be implemented during construction, operation and maintenance, and decommissioning to mitigate the risks of accidental spills of hazardous materials. Measures to reduce instances of spills, remedial action and response measures to be used in the event of a spill or collision, and detailed measures for refuelling at sea. These measures will prevent a release of hazardous material of a scale large enough to meet the thresholds set out in **Table 26.4** for the affected receptors and the risk is considered ALARP.

26.5.3.6 Disturbance of UXO in Offshore Development Area

48. Consent for UXO removal will be sought in a future Marine Licence application when geophysical survey data of suitable spatial resolution is available to identify and quantify UXO risk. Further detail on disturbance of UXO and underwater noise and impacts and mitigation is also included in **Chapter 11: Fish and Shellfish Ecology** and **Chapter 12: Marine Mammal and Marine Turtle Ecology**.

49. The following embedded mitigation measures have been included to reduce the risk of disturbance of UXO:

- Pre-construction surveys will be implemented by the Offshore Project in order to identify any potential hazards within the Windfarm Site and Offshore Export Cable Corridor. These will include geophysical surveys to identify seabed hazards such as discarded fishing gear or unidentified objects and magnetometer surveys to identify for the presence of UXO devices. Further information on the intended pre-construction campaigns is outlined in **Chapter 5: Project Description**.

50. A Unexploded Ordnance Risk Mitigation Strategy will be developed post-consent:

- Avoidance - a strategy of potential unexploded ordnance (pUXO) detection and avoidance is proposed as the most cost effective and efficient method of reducing UXO risks to ALARP. By surveying for and avoiding direct or indirect contact with any pUXO (the source of the risk) and by moving any intrusive activity away from such prospective hazards (where practicable), such risks are avoided.

- Removal of risk receptors - an alternative option is to remove the receptor element (of the source-pathway-receptor model), by moving certain sensitive and vulnerable receptors (typically the crews of offshore vessels), to a safe distance from the point of the intrusive activity and thus the pUXO hazard, so that it will diminish sufficiently the prospective blast, fragmentation (the former and latter are through air effects) and/or shock wave (a through water effect) consequences, in order to reduce UXO risks to ALARP.
- Removal of Threat Sources - Where pUXO cannot be avoided, another alternative option, is to verify pUXO by investigation and where it is confirmed unexploded ordnance (cUXO), to remove it (effectively removing the source element of the source-pathway-receptor model), either by moving it to a position where it can do no harm (but only when it is safe to do so and wherever permit licencing and consent condition allow such actions), and/or by destroying it or otherwise rendering it safe.
- In high and medium risk zones geophysical UXO survey is recommended prior to the commencement operations that are planned within the boundaries of the Study Area, in order to provide the basis for a strategy of pUXO avoidance, or for its identification and removal.
- Surface detection for threat spectrum UXO should consist of either Side Scan Sonar, Multi Beam Echo Sounder and/or Work Class Remotely Operated Vehicle camera search (subject to visibility and resolution, especially in areas where shallow water operations are planned), over the area of proposed operations and prior to their commencement.
- Sub-surface detection for threat spectrum UXO should also be undertaken ahead of seabed intrusive operations and should consist of magnetometer/gradiometer survey over the area of the proposed operations.
- Any vessels involved in intrusive works should be equipped with UXO specific Emergency Response plans, so that in the event of an unplanned UXO discovery the vessel Master and/or the offshore superintendent/party chief (or similar) are informed in advance about what safety actions must be taken.

51. With the mitigation in place the risk of a major accident occurring due to this hazard is determined to be ALARP.

26.5.3.7 Floating Wind Turbine Generator (WTG) breaking free during tow or from moorings

52. The MCA require under their Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA & HSE, 2017) that developers arrange Third Party Verification (TPV) of the mooring systems by an independent and competent person

/ body. The Regulatory Expectations state that TPV is a "continuous activity", and that any modifications to a system or if new information becomes available with regard to its reliability, additional TPV would be required.

53. On this basis, a WTG breaking free of its moorings is considered likely to represent a low frequency event, noting that for a total loss of station, all moorings would be required to fail (based on current envelope there will be between three and six per WTG depending on the design chosen).

54. The Regulatory Expectations also require the provision of continuous monitoring either by Global Positioning System (GPS) or other suitable means, the Applicant will put such a system in place, with each WTG continuously monitored, and with capability of being tracked via Automatic Identification Systems (AIS) in the event of a loss of station as detailed in MGN 654. Each WTG will also have an alarm system in place, whereby an alert will be provided to the Marine Coordination Centre in the event that any floating substructure leaves a pre-defined ringfenced alarm zone. This means in the unlikely event that a floating substructure suffers total loss of station and drifts outside of its alarm zone, the Applicant would be made aware, and would be able to track its position and make the necessary emergency arrangements. The NRA concludes therefore this this impact would be broadly acceptable.

55. Any issues during tows of WTGs to and from the Windfarm Site (either during construction or operation and maintenance) such as vessel breakdowns would be mitigated by existing procedures relating to shipping and navigation listed in

56. **Table 26.7**.

57. The aim is to design out the scenario where an emergency tow is required by following appropriate design codes and draw on experience gained by the oil and gas industry. The number of mooring lines per floating substructure allows for some failure (in relation to metocean conditions or vessel allision, for example) whilst maintaining integrity of the mooring system. The materials for each mooring line are selected to ensure stability and wear resistance, whilst the attachment points are designed for fatigue.

58. During construction, all aspects of the mooring system and the attachment points will be subject to thorough scrutiny. As the floating substructures are classed as ships, there will be compliance with flag state rules and a class surveyor will be present throughout. Third party verification (TPV) of the mooring systems will be undertaken by an independent and competent body to ensure they meet the required standards. Once at the wind farm site, a programme of inspection of the floating substructures and mooring systems will be in place on a pre-determined cycle.

59. Each unit will have a GPS system which sets off an alarm if movement starts goes beyond a pre-set limit, for example from a ship allision. It should be noted that this limit is less than what would be expected from a mooring failure and would trigger a response to check the moorings. The alerts will be provided to the Marine Coordination Centre.

60. The floating substructures will probably have mooring bollards that could take tow lines. However, onboard access would be required to attach tow lines, which may be challenging in adverse weather conditions. In such an event, warning mechanisms will be used to give adequate notification to ensure the safety of other sea users until weather conditions are suitable for a towing connection to be made. The procedures for emergency situations will all be detailed in an ERCoP that will be approved by the MCA and Trinity House.

61. When the units are under tow to or from the wind farm site there will be emergency tow bridles in place, in addition to the tow lines. The bridles float on the surface with a buoy at the free end, but these are not permanent features as the floating lines can be degraded by UV and marine growth and potentially fail at the critical moment.

26.5.3.8 Workplace accident (on vessel, within Wind Farm)

62. Other workplace accidents which could lead to major accidents will be avoided by means of training of personnel and ensuring that all personnel have all required qualifications, that qualifications are maintained, and that regular project specific information (e.g. toolbox talks) is promulgated to staff. All equipment, plant and vessels will be fit for purpose and maintained as required. In addition to training, all necessary requirements for dealing with accidents (first aid equipment, firefighting equipment) would be in place to deal with workplace accidents/incidents.

63. With all of the above in place the risk is considered ALARP.

26.5.4 Stage 4

64. At this stage, the mitigation measures are evaluated to ensure that risks from the hazards are sufficient to reduce risks ALARP.

65. Mitigation measures are embedded into the construction, operation, maintenance and decommissioning phases of the Offshore Project and, alongside use of industry safety standards, will act to minimise the impacts on the relevant receptors identified during Stage 3. With a commitment to the highest health and safety standards in design and working practices enacted, none of the anticipated construction works or operational procedures is expected to pose an appreciable risk of major accidents or disasters.

26.6 Summary

66. Consideration of the likely significant effect for potential major accidents and disasters during the construction, operation and maintenance and decommissioning phases of the Offshore Project has been carried out following available guidance and legislation. The residual risk for hazards scoped in for further assessment are considered to be ALARP. A summary of the results of the assessment is provided in **Table 26.8**.

Table 26.8 Summary of Potential Hazards Relating to the Project

Hazard/activity	Source	Pathway	Receptor Groups	ES Chapter(s) / Document Addressing this Risk	Embedded mitigation	Risk of Major Accident or Disaster After Mitigation
Major fires	A major fire may lead to serious damage to the environment through harmful emissions to air and sea, and create a localised fire hazard	Direct	• Human health • Designated Sites • Scarce Habitats • Widespread habitat • Particular species	N/A – an ERCoP and PEMP will be developed post-consent	ERCPs will be developed following discussions with the Maritime Coastguard Agency, including risk assessments and designated evacuation plans for workers on board in unlikely event of fire breaking out. Development of a PEMP will outline safety measures to reduce the risk of a major accident or disaster resulting from substation fires.	Risk is ALARP
Exposed cables leading to vessel snagging	Vessel contact with exposed inter-array cables	Direct	• Human health • Designated Sites • Scarce Habitats • Widespread habitat	**Chapter 15: Shipping and Navigation** **Appendix 8.C: CBRA**	The CBRA (**Appendix 8.C**) sets out the installation methods used to mitigate environmental and navigational issues. Cabling burial techniques, where possible, and the Offshore Project will comply with all cabling industry standards in	

Hazard/activity	Source	Pathway	Receptor Groups	ES Chapter(s) / Document Addressing this Risk	Embedded mitigation	Risk of Major Accident or Disaster After Mitigation
			• Particular species		locations where cabling infrastructure will be buried. A Notice to Mariners will be issued to reduce the potential for accidents involving vessels is reduced. Offshore infrastructure will be marked on nautical charts including an appropriate chart note.	
Vessel interactions (e.g. collision, allision)	Vessel to vessel collision or allision.	Direct	• Human health • Designated Sites • Scarce Habitats • Widespread habitat • Particular species	**Chapter 15: Shipping and Navigation** **Appendix 15.A: NRA** **Chapter 18: Infrastructure and Other Users**	Embedded mitigation is listed in **Table 26.7**.	
Aviation collision	Aviation collision with offshore	Direct	• Human health	**Chapter 17: Civil and Military Aviation**	• Notification to aviation stakeholders	

Hazard/activity	Source	Pathway	Receptor Groups	ES Chapter(s) / Document Addressing this Risk	Embedded mitigation	Risk of Major Accident or Disaster After Mitigation
	infrastructure or vessels		• Designated Sites • Scarce Habitats • Widespread habitat • Particular species		• Regularity of layout, aviation lighting and marking • Mitigation for construction (including towing of turbines and lighting of construction plant) • Compliance with requirements for SAR.	
Accidental spills of hazardous material	Accidental spills of hazardous material	Direct	• Human health • Designated Sites • Scarce Habitats • Widespread habitat • Particular species	N/a - PEMP and MPCP will be developed post-consent	A PEMP will be produced and followed to cover the construction, O&M phase of the Project. This will include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. MPCP will set the management measures to be implemented during construction, operation and decommissioning to mitigate the risks of accidental spills of	

Hazard/activity	Source	Pathway	Receptor Groups	ES Chapter(s) / Document Addressing this Risk	Embedded mitigation	Risk of Major Accident or Disaster After Mitigation
					hazardous materials. Measures to reduced instances of spills, remedial action and response measures to be used in the event of a spill or collision, and detail measures for refuelling at sea.	
Disturbance of UXO in Offshore Development Area	Disturbance of UXO	Direct	• Human health • Designated Sites • Scarce Habitats • Widespread habitat • Particular species	Information on the intended pre-construction campaigns is outlined in **Chapter 5: Project Description**. Further detail on disturbance of UXO and underwater noise and impacts and mitigation is also included in **Chapter 11: Fish and Shellfish Ecology** and **Chapter 12: Marine Mammal and Marine Turtle Ecology**.	• Implementation of UXO clearance campaign prior to construction. • Detonation, relocation, or retrieval of UXO, or implementation of safety zones • UXO surveys during operation for activities that may interact with the seabed. A Risk Mitigation Strategy will be developed as part of the UXO Risk Assessment. This includes mitigation strategies to	

Hazard/activity	Source	Pathway	Receptor Groups	ES Chapter(s) / Document Addressing this Risk	Embedded mitigation	Risk of Major Accident or Disaster After Mitigation
					avoid pUXOs in the first instance, removing risk receptors or threat sources if required.	
Floating WTG breaking free	Floating WTG breaking free during tow or from moorings	Direct	• Human health • Designated Sites • Scarce Habitats • Widespread habitat • Particular species	**Appendix 14.A: NRA**	• TPV of the mooring systems • GPS monitoring	Risk is ALARP
Workplace accident	On vessel within Windfarm Site or Offshore Export Cable Corridor		Human health	N/a - PEMP will be developed post-consent	• Personal Protective Equipment • (PPE) • Guard Vessels • Inspection and Maintenance Programme • Training	

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