



Bellrock Offshore Wind Farm

Wind Farm Development Area

Environmental Impact Assessment Report - Volume II

Chapter 19: Major Accidents and Disasters

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Glossary of Terminology

Term	Definition
Applicant	Bellrock Offshore Wind Farm Limited, the legal entity submitting Section 36 Consent and Marine Licence applications for Bellrock Wind Farm Development Area.
Bellrock Offshore Wind Farm (or the Bellrock Project)	<p>An offshore wind farm capable of exporting up to 1.8 GW of renewable energy to the National Electricity Transmission System.</p> <p>The Wind Farm Development Area is located 120 km east of Stonehaven, and will connect to the National Electricity Transmission System at the proposed SSEN Transmission Hurlie substation, west of Stonehaven in Aberdeenshire. The Bellrock Offshore Wind Farm comprises of the following Development Areas:</p> <ul style="list-style-type: none"> ▪ Wind Farm Development Area; ▪ Offshore Transmission Development Area; and ▪ Onshore Transmission Development Area.
Cable protection	Protective measure to minimise the effects of scour and hazards along the inter-array cables, and protecting these cables at infrastructure crossing points.
Development Area	<p>For consenting purposes, the area for which separate consents and/or Marine Licences will be sought by the Applicant, comprising:</p> <ul style="list-style-type: none"> ▪ Wind Farm Development Area; ▪ Offshore Transmission Development Area; and ▪ Onshore Transmission Development Area.
Disaster	A disaster can be a man-made or external hazard (e.g. act of terrorism) or a natural hazard (e.g. earthquake) with the potential to cause an event classified as major accident (IEMA, 2020).
Extreme weather event	A weather event that is significantly different from the average or typical weather pattern, also known as acute or event-driven climate hazard.
Floating offshore unit	The combined wind turbine generator and floating substructure.
Floating substructure	A floating structure which provides buoyancy and, in conjunction with the station keeping system, supports a superstructure (e.g. wind turbine generator or offshore substation), and maintaining its position within the structure's excursion limit.
Inter-array cable	Armoured cable containing electrical and fibre optic cores, which link the wind turbine generators to each other and to the subsea cable hubs and/or the offshore substations and include dynamic inter-array cable and static inter-array cable sections.
Likelihood	The probability or the chance of a particular event to occur.
Major accident	Refers to incidents that pose immediate or long-term serious risks to human health, welfare, and the environment (IEMA, 2020).
Man-made hazard	A hazard derived from human activities or actions, e.g. structural collapse, human error, design error, arson, terrorism, vessel collision, pollution, fire, conflict etc. (IEMA, 2020).

Term	Definition
Natural hazard	A hazard derived from natural occurring events, e.g. earthquakes, volcanic eruptions, fire, high winds, storms, tsunamis, epidemics etc. (IEMA, 2020).
Offshore substation	An offshore platform which houses electrical equipment such as transformers, switchgear, and protection and control systems, enabling the wind farm's renewable electricity to be received via inter-array cables and exported via the offshore export cables.
Offshore Transmission Infrastructure	Infrastructure located within the Offshore Transmission Development Area including fixed bottom and/or floating offshore substations, offshore reactive compensation station(s) and associated scour protection; interconnector cables and associated cable protection; and offshore export cables and associated cable protection (including activities associated with the Offshore Transmission Infrastructure construction, operation and maintenance, and decommissioning).
Pathway	The route by which the source can reach the receptor (IEMA, 2020).
Project design envelope	Includes all relevant technical, spatial and temporal elements of the Wind Farm Infrastructure, and the proposed methodology to be employed for construction, operations and maintenance, and decommissioning.
Risk	Likelihood of an impact happening, along with the resulting effects or consequences on a receptor if it does occur (IEMA, 2020).
Scour protection	Protective material positioned around anchors to avoid sediment being eroded as a result of the flow of water.
Site preparation works	<p>Preparatory activities undertaken within the Wind Farm Development Area prior to the commencement of construction of the Wind Farm Infrastructure, which may comprise (and which may require separate consents):</p> <ul style="list-style-type: none"> ▪ Geophysical surveys, geotechnical surveys, and non-archaeological/archaeological diver/remotely operated vehicle surveys; ▪ Seabed preparation including sand wave levelling, slope levelling for gravity based anchors (if selected), boulder clearance, and pre-lay grapnel runs; ▪ Unexploded ordnance survey and/or clearance; ▪ Debris clearance; and ▪ Out of service cable/pipeline removal.
Source	The original cause of the hazard, which has the potential to cause harm (IEMA, 2020)
SSEN Transmission Hurlie substation	The onshore substation to be developed by SSEN Transmission, which will receive renewable electricity from the Bellrock Project onshore substation and allow supply of renewable electricity from the wind farm to the National Electricity Transmission System.
Station keeping system	The system (including mooring lines and anchors) used to hold a floating offshore unit within its excursion limit and maintain the intended orientation of the floating offshore unit.

Term	Definition
Subsea cable hub	A subsea device, with a gravel pad foundation, which allows the connection of multiple inter-array cables.
Vulnerability	Describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to the 'exposure and resilience' of the development to the risk of a major accident and/or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact (IEMA, 2020)
Wind Farm Development Area	The boundary within which the Wind Farm Infrastructure will be constructed, operated and maintained, and decommissioned.
Wind Farm Infrastructure	Infrastructure located within the Wind Farm Development Area including wind turbine generators; floating substructures, station keeping systems and associated scour protection; inter-array cables and associated cable protection; subsea cable hubs; and ancillary infrastructure including buoys (including activities associated with the Wind Farm Infrastructure construction, operation and maintenance, and decommissioning).
Wind turbine generator	A wind turbine generator converts wind energy into electrical energy. The main components include rotor assembly (composed of three blades and a hub); nacelle (containing the generator, shaft and gearbox, power electronic converter and transformer); and a tower (containing lifting equipment and switchgear).

Glossary of Abbreviations

Term	Definition
ALARP	As Low As Reasonably Practicable
AtoN	Aids to Navigation
BWM	Ballast Water and Sediments
CBRA	Cable Burial Risk Assessment
CDM	Construction, Design and Management Regulations
COLREGs	International Regulations for Preventing Collisions at Sea
COMAH	Control of Major Accident Hazards Regulations
CMS	Construction Method Statement
DSLIP	Development Specification and Layout Plan
EIA	Environmental impact assessment
EMS	Environmental Management System
ERCoP	Emergency Response Cooperation Plan
EU	European Union
FOU	Floating offshore unit
FSS	Floating substructure
GPS	Global Positioning System
HSE	Health and Safety Executive
IAC	Inter-array cables
IEMA	Institute for Environmental Management and Assessment
IMO	International Maritime Organisation
ISEP	Institute of Sustainability and Environmental Professionals
ISO	International Organization for Standardization
LMP	Lighting and Marking Plan
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate - Licensing and Operations Team
MGN	Marine Guidance Note
MHSWR	Management of Health and Safety at Work Regulations

Term	Definition
MPA	Marine Protected Area
MPCP	Marine Pollution Contingency Plan
NLB	Northern Lighthouse Board
NMP	National Marine Plan
NRA	Navigational Risk Assessment
NRR	National Risk Register
NSP	Navigational Safety Plan
O&M	Operation and maintenance
OfSS	Offshore substation
OH&S	Occupational Health and Safety
OMAR	Offshore Major Accident Regulator
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
PD	Decommissioning Plan
s.36	Section 36 of the Electricity Act 1989
SAC	Special Areas of Conservation
SAR	Search and Rescue
sks	Station keeping system
SOLAS	International Convention for the Safety of Life at Sea
SPA	Special Protection Areas
SWFPA	Scottish White Fish Producers Association
UK	United Kingdom
UKCP	UK Climate Projections
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded ordnance
VMP	Vessel Management Plan
VMNSP	Vessel Management and Navigational Safety Plan
WFDA	Wind Farm Development Area
WTG	Wind turbine generator

19 Major Accidents and Disasters

19.1 Introduction

1. This Chapter of the Bellrock Wind Farm Development Area (WFDA) environmental impact assessment (EIA) Report presents an assessment of potential effects related to major accidents and disasters from the construction, operation and maintenance (O&M), and decommissioning phases of the Bellrock Wind Farm Infrastructure.
2. The Bellrock Wind Farm Infrastructure comprises wind turbine generators (WTGs), floating substructures (FSSs), station keeping systems (skss) and associated scour protection, inter-array cables (IACs) and associated cable protection, subsea cable hubs, and ancillary infrastructure including buoys. Further detail on the Bellrock Wind Farm Infrastructure is provided in **Chapter 4: Project Description (Volume II)**.
3. This Chapter of the Bellrock WFDA EIA Report has been prepared to provide the Marine Directorate - Licensing and Operations Team (MD-LOT) (on behalf of the Scottish Ministers) and stakeholders with sufficient information to determine the potential effect(s) of the Bellrock Wind Farm Infrastructure on major accidents and disasters.
4. This Chapter should be read in conjunction with the following chapters of the Bellrock WFDA EIA Report:
 - **Chapter 6: Marine Geology, Oceanography and Physical Processes (Volume II);**
 - **Chapter 7: Benthic Ecology (Volume II);**
 - **Chapter 8: Fish and Shellfish Ecology (Volume II);**
 - **Chapter 9: Marine Mammal (Volume II);**
 - **Chapter 10: Offshore Ornithology (Volume II);**
 - **Chapter 11: Commercial Fisheries (Volume II);**
 - **Chapter 12: Shipping and Navigation (Volume II);**
 - **Chapter 13: Aviation and Radar (Volume II);**
 - **Chapter 14: Marine Infrastructure and Other Users (Volume II);**
 - **Chapter 15: Marine Archaeology and Cultural Heritage (Volume II);**
 - **Chapter 16: Socioeconomics, Tourism and Recreation (Volume II);**
 - **Chapter 17: Greenhouse Gas Assessment (Volume II);** and
 - **Chapter 18: Climate Change Risk (Volume II).**

5. The major accidents and disasters assessment is likely to have key inter-relationships with the above receptors, which will be considered appropriately throughout this Bellrock WFDA EIA Report.
6. This Chapter was prepared by Haskoning.

19.1.1 Key Definitions

7. The key definitions provided below are based on the Institute for Environmental Management and Assessment (IEMA) Major Accidents and Disasters in EIA - A Primer (IEMA, 2020)¹. These definitions are essential for understanding the context and implications of Major Accidents and Disasters in the EIA process for the Bellrock Wind Farm Infrastructure.
 - Accident: An event that occurs unexpectedly or by chance;
 - 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 accidental loss of containment) or external hazards (e.g. act of terrorism) which result in consequences for people or the environment;
 - 'Major accidents' are defined as 'events that threaten immediate or delayed serious environmental effects to human health, welfare and/or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events;
 - A 'receptor' refers to the specific component of the environment that could be adversely affected if the source reaches it. Noting that 'ALARP' (As Low As Reasonably Practicable) describes the level to which we expect to see risks controlled;
 - ALARP is used in assessment of major accidents and disasters involves 'weighing a risk against the trouble, time and money needed to control';
 - Risk: Likelihood of an impact happening, along with the resulting effects or consequences on a receptor if it does occur;
 - Risk Event: An identified, unplanned event relevant to the Proposed Development that could result in a major accident or disaster, subject to assessment for significant adverse effects on an environmental receptor;
 - '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 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

¹ IEMA rebranded to the Institute of Sustainability and Environmental Professionals (ISEP) in mid-2025.

permanent or long-lasting harm to environmental receptors that cannot be restored through minor clean-up or restoration efforts;

- 'Significant Environmental Effect': In the context of major accident and disaster assessment, this includes loss of life, permanent injury, and the temporary or permanent destruction of an environmental receptor that cannot be restored through minor clean-up and restoration efforts;
- A 'source' refers to the original cause of the hazard, which has the potential to cause harm; and
- Vulnerability: Describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to the 'exposure and resilience' of the development to the risk of a major accident and/or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact.

19.2 Legislation, Policy and Guidance

8. The following legislation, policy and guidance are relevant to major accidents and disasters. Further information is presented in **Chapter 2: Policy and Legislative Context** of the Bellrock WFDA EIA Report.
9. Any Legislation referred to in this EIA Report is as subsequently amended and as currently in force as at the date of this EIA Report.

19.2.1 Legislation

The screening and assessment of major accidents and disasters has been developed with reference to the legislation presented in **Table 19.1** below.

Table 19.1: Overview of Relevant Legislation for Major Accidents and Disasters

Relevant Legislation	Overview
Health and Safety at Work etc. Act 1974	The Health and Safety at Work etc Act 1974 is the primary legislation governing workplace health and safety in the United Kingdom (UK). This Act aims to secure the health, safety and welfare of people at work by identifying and assessing risks arising from work activities and ensuring that all potential hazards, including major accidents and disasters, are managed and mitigated.
The Management of Health and Safety at Work Regulations 1999	The Management of Health and Safety at Work Regulations (MHSWR) 1999 were designed to reinforce the Health and Safety Act etc. 1974 by outlining employers' responsibilities and general principles of prevention to manage health and safety in the workplace. This includes conducting risk assessments, developing an overall prevention policy and implementing protective measures to ensure employee safety.
Construction Design and Management Regulations 2015	The Construction Design and Management (CDM) Regulations 2015 aim to improve health and safety conditions in the construction industry by defining specific duties for different stakeholders, including clients, designers, and contractors, throughout the facility development process.

Relevant Legislation	Overview
The Control of Major Accident Hazards Regulations 2015	<p>The Control of Major Accident Hazards Regulations 2015 (COMAH¹) Regulations 2015 aims to prevent and mitigate the effects of major accidents involving dangerous substances that could pose significant risks to human health and/or the environment.</p> <p><i>General duties of operators - 5.—(1) Every operator must take all measures necessary to prevent major accidents and to limit their consequences for human health and the environment.</i></p>
The Civil Contingencies Act 2004 and the Civil Contingencies Act 2004 (Contingency Planning) (Scotland) Regulations 2005	Provide a comprehensive framework for civil protection in the UK aimed at ensuring the country is prepared to respond to emergencies by assessing risks and developing emergency response plans.
Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015	They implement the European Union (EU) Offshore Safety Directive, aiming to enhance the safety of offshore oil and gas operations in external waters, including the territorial sea adjacent to Great Britain and any designated area within the UK continental shelf. Key provisions include the requirement for operators to prepare and maintain safety cases, demonstrating how they identify and manage major accident hazards, and the establishment of a Corporate Major Accident Prevention Policy, outlining the company's approach to preventing major accidents.
The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 implement the requirements of the EU environmental impact assessment Directive, aiming to ensure that the environmental effects of electricity works are properly assessed before consent is granted. Key provisions include the requirement for developers to prepare an EIA Report, detailing the potential environmental impacts of the proposed project, and the obligation for Scottish Ministers to consider this report, along with consultations from relevant authorities, before making a decision.
The Marine Works (Environmental Impact Assessment) Regulations 2007 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017	Both regulations are used as reference for the screening and assessment of major accidents and disasters. Further details of these regulations are presented in Chapter 2: Policy and Legislative Context of the Bellrock WFDA EIA Report .
International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78	As a party to MARPOL, the UK is required to comply with this international convention, which aims to prevent marine pollution from ships due to operational or accidental causes.
International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention, 2004)	As a member of the International Maritime Organisation (IMO), the UK is required to comply with the BWM Convention, which aims to prevent the spread of harmful aquatic organisms and pathogens by controlling and managing ships' ballast water and sediment.
Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs)	Adopted by the IMO, these regulations set out the navigation rules to be followed by ships and other vessels at sea to prevent collisions.

Relevant Legislation	Overview
International Convention for the Safety of Life at Sea (SOLAS), 1974	Adopted by the IMO, this convention sets minimum safety standards in the construction, equipment, and operation of merchant ships.
Notes: ¹ The COMAH regulations apply to onshore facilities but provide applicable definitions to this Chapter.	

19.2.2 Policy

10. The UK Marine Policy Statement 2011 sets out the framework for preparing marine plans and decision-making concerning the marine environment. Scotland's National Marine Plan (NMP, 2015) covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The NMP includes policies addressing marine management promoting sustainable development while protecting the marine environment.

The screening and assessment of major accidents and disasters has been developed with reference to relevant policies presented in **Table 19.2**.

Table 19.2: Overview of Relevant Marine Plan Policies for Major Accidents and Disasters

Relevant Policy	Overview
General Policy 4 Co-existence	This policy emphasises the importance of ensuring that different marine activities can coexist in a way that minimises conflicts and maximises mutual benefits. It encourages marine planners and decision makers to consider the cumulative impacts of various activities and promote synergies where possible. Proposals that bring together compatible or synergistic activities in one location are encouraged to make efficient use of space and resources.
General Policy 5 Climate change	This policy emphasises the need for marine planners and decision makers to act in ways that mitigate and adapt to climate change. It encourages a transition to a low carbon economy by reducing greenhouse gas emissions and ensuring that developments are designed to adapt to the impacts of a changing climate. This includes appropriate siting and design of offshore and coastal developments, considering vulnerability, scale, and longevity.
General Policy 9 Natural Heritage	This policy focuses on the protection and enhancement of Scotland's natural marine heritage. It requires marine planners and decision makers to ensure that development and use of the marine environment do not harm the natural heritage and, where possible, contribute to its enhancement. This includes safeguarding biodiversity, habitats, and ecosystem services, and considering compensatory habitat creation or enhancement if significant harm cannot be avoided. 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; and (c) Protect and, where appropriate, enhance the health of the marine area.

19.2.3 Guidance

The screening and assessment of major accidents and disasters has been developed with reference to relevant guidance presented in **Table 19.3** below.

Table 19.3: Overview of Relevant Guidance for Major Accidents and Disasters

Relevant Guidance	Overview
The International Organization for Standardization (ISO) 31000:2018. Risk Management – Principles and Guidelines (International Organization for Standardization, 2018a)	ISO 31000:2018 is a comprehensive framework for managing risk effectively across organisations. This ISO standard aims to identify, assess and manage risks through a systematic process.
ISO 14001:2015. Environmental management system (International Organization for Standardization, 2015)	Provides a framework for organizations to design and implement their environmental management systems (EMS) and demonstrate how there are managing their environmental impacts. Regarding emergency preparedness and response, clause 8.2 of the ISO 14001: 2015 sets out guidance on the process's organisations should have in place to prevent, mitigate, prepare, respond and recover from an emergency situation.
ISO 45001:2018. Occupational health and safety management systems (International Organization for Standardization, 2018b)	Specifies requirements for occupational health and safety (OH&S) management system, and gives guidance for its use, to enable organizations to provide safe and healthy workplaces by preventing work-related injury and ill health, as well as by proactively improving its OH&S performance. Regarding emergency preparedness and response, clause 8.3 of the ISO 45001: 2018 sets out guidelines for structured and proactive approach for the handling of workplace emergencies including the identification of potential emergency situations, development of response plans, training of employees, conduction of regular drills, and continuous emergency preparedness improvements.
IEMA ¹ , 2016. EIA Quality Mark	A voluntary scheme operated by IEMA that allows developers and consultancies to commit to excellence in the EIA activities.
IEMA, 2020. Major Accidents and Disasters in EIA: A Primer	Provides a structured methodology for identifying, assessing and mitigating the risks of major accidents and disasters during the EIA process.
IEMA, 2017. EIA Quality Mark Article: What is this MADness?	Provides a guidance on how to incorporate risk assessments associated with major accidents and disasters into the EIA process.
Guidelines for Environmental Risk Assessment and Management - Green Leaves III (Defra, 2011)	Provides a structured and systematic approach for identifying, evaluating and mitigating environmental risks to ensure human health and environmental protection.
Offshore Major Accident Regulator (OMAR) - Memorandum of Understanding between the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) and the Health and Safety Executive (HSE)	The Memorandum establishes a collaborative framework for regulating offshore oil and gas operations in the UK. Key elements include the coordination of regulatory activities to effectively manage and control major accident hazards, and the creation of clear communication channels between OPRED and HSE to enhance safety and environmental protection.

Relevant Guidance	Overview
The Offshore Installations (Offshore Safety Directive) (Safety Case etc) Regulations 2015 – Guidance of Regulations (HSE 2015)	Provides a framework for ensuring safety and environmental protection in offshore oil and gas operations.
Marine Guidance Note (MGN) 654 - Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response. (MGN 654) (Maritime and Coastguard Agency; MCA, 2021)	Provides guidance for ensuring navigational safety and effective emergency response for Offshore Renewable Energy Installations and Search and Rescue (SAR) operations.
Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA and HSE, 2017)	This document, produced in collaboration with the MCA and the HSE, provides guidance on the design, installation, operation, and decommissioning of mooring systems for floating wind and marine devices.
Guidance on the Interpretation of Major Accident to the Environment for the purposes of the COMAH regulations (Scottish Environment Protection Agency, 1999)	This guidance provides detailed instructions on identifying and assessing major accidents that could significantly impact the environment.
Notes: ¹ Currently known as ISEP.	

19.3 Consultation

11. Consultation undertaken to date for the Bellrock Wind Farm Infrastructure relevant to major accidents and disasters has been in line with the general process described in **Chapter 5: EIA Methodology (Volume II)**. Key consultation pertinent to this Chapter is provided in **Table 19.4** below. Additional topic specific consultation is discussed within each technical chapter (**Chapters 6 - 19 (Volume II)**).

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Table 19.4: Consultation Relevant to Major Accidents and Disasters

Consultee	Date/Document	Comment	How/Where Comment is Addressed
MD-LOT	Marine Directorate – Licensing Operations Team: Scoping Opinion for Bellrock WFDA (08 August 2024)	The EIA report must include a description and assessment of the likely significant effects deriving from the vulnerability of the Proposed Development to major accidents and disasters. The Developer should make use of appropriate guidance, including the recent IEMA ‘Major Accidents and Disasters in EIA: A Primer’, to better understand the likelihood of an occurrence and the Proposed Development susceptibility to potential major accidents and hazards. The description and assessment should consider the vulnerability of the Proposed Development to a potential accident or disaster and also the Proposed Development potential to cause an accident or disaster.	Guidance (including the IEMA Primer) used to undertake this assessment is provided in Section 19.2 . Assessment methodology is presented in Section 19.4 and the assessment of major accidents and disasters is presented in Section 19.6 .
MD-LOT	Marine Directorate – Licensing Operations Team: Scoping Opinion for Bellrock WFDA (08 August 2024)	The Scottish Ministers advise that existing sources of risk assessment or other relevant studies should be used to establish the baseline rather than collecting survey data and note the IEMA Primer provides further advice on this. This should include the review of the identified hazards from your baseline assessment, the level of risk attributed to the identified hazards and the relevant receptors to be considered.	The methodology (including for advice from the IEMA Primer) is discussed in Section 19.4 .
MD-LOT	Marine Directorate – Licensing Operations Team: Scoping Opinion for Bellrock WFDA (08 August 2024)	The assessment must detail how significance has been defined and detail the inclusions and exclusions within the assessment. Any mitigation measures that will be employed to prevent, reduce or control significant effects should be included in the EIA Report.	The methodology is discussed in Section 19.4 and the assessment is presented in Section 19.6.1 and 19.6.2 .

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19.4 Assessment Methodology

19.4.1 Methodological Approach

12. The assessment of the impacts of major accidents and disasters has been conducted in accordance with the guidelines outlined in the “Major Accidents and Disasters in EIA: A Primer” (IEMA, 2020) which provides guidance on a risk-based approach.
13. The following steps have been undertaken for the assessment:
 - **Stage 1:** Identify the hazards in a long list of possible major accidents and events. Major accidents with little or no relevance to the Bellrock WFDA were not included (e.g. volcanic eruptions). Sources included the UK Government National Risk Register (NRR) – 2025 edition. This stage also involved identification of the receptors in the existing environment;
 - **Stage 2:** Screening exercise to determine which hazards are relevant to the Bellrock WFDA and require further assessment;
 - **Stage 3:** Hazards evaluation - definition of the likely significant effects 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; and
 - **Stage 4:** Determination of whether the risk of hazards to occur has been mitigated to ALARP and the identification of any residual risk, and the consequences upon the receptors in the event of a major accident or disaster.
14. 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 19.5**.
15. 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 would be infrastructures that did not comply with design codes). These are therefore outside the scope of this assessment. Low impact events which do not meet the criteria listed in **Table 19.5** are not considered a major accident or disaster and are therefore outside the scope of this assessment.
16. This assessment therefore will focus largely on low likelihood, but potentially high consequence events with the potential to occur within the Bellrock WFDA that may be determined to constitute a major accident or disaster. This Chapter also sets out the relevant embedded and additional mitigation and assesses, with these measures in place, whether impacts have been reduced ALARP or avoided. Events relating to a planned or known activity, such as noise and vibration from piling, are covered within other relevant chapters of this EIA Report, where assessment of the impacts and mitigation is provided.

17. The assessment has considered the vulnerability of the Bellrock Wind Farm Infrastructure to be affected by a potential accident or disaster as well as the potential for the Bellrock Wind Farm Infrastructure to cause an accident or disaster.

19.4.2 Potential Receptors

18. The potential receptors relevant to this screening and assessment are provided with definitions in **Table 19.5**. The level of harm thresholds considered to represent a major accident or disaster is also presented. The thresholds have been determined using industry good practice based upon the former criteria for the notification of a major accident to the European Commission (Schedule 5 of the COMAH Regulations) and guidance on the interpretation of major accidents to the environment for the purpose of the COMAH Regulations (Department of the Environment, Transport and the Region, 1999).

Table 19.5: Key Receptors for Major Accidents and Disasters' Threshold for the Bellrock Wind Farm Infrastructure

Receptor Type	Receptor Included	Major Accident Threshold
Population and human health	Construction workers, operations and maintenance workers, and other sea users.	<p>For the public and other sea users:</p> <ul style="list-style-type: none"> ▪ Substantial number (five or more) of people requiring medical attention or any serious/life-changing injuries. Events of this magnitude may also involve some damage to housing, with low numbers of people being displaced. Potential for localised interruption to utilities and damage to infrastructure. <p>For workers:</p> <ul style="list-style-type: none"> ▪ Multiple life changing injuries or fatalities.
Designated Sites (International, National and Other)	Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Marine Protected Areas (MPAs).	<p>For SACs, SPAs and MPAs, the thresholds are:</p> <ul style="list-style-type: none"> ▪ 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.
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 priority species, including rare species.	<p>For common species, where reliable estimates of population numbers exist, the threshold is death of, or serious sub-lethal effects within 1% of any species.</p> <p>For common plant species, the threshold is the death of, or serious sub-lethal effects within, 5% of the ground cover.</p> <p>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 should be used to determine the appropriate threshold.</p> <p>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).</p>
Marine environment	Non-estuarine marine waters, sub-littoral zones, benthic community adjacent to the coast and fish spawning grounds.	<p>Permanent or long-term damage to:</p> <ul style="list-style-type: none"> ▪ 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

Receptor Type	Receptor Included	Major Accident Threshold
		<ul style="list-style-type: none">▪ An area of 100 ha or more of the open sea benthic community. Or a count of: <ul style="list-style-type: none">▪ 100 or more dead sea birds (not gulls), or▪ 500 or more dead sea birds of any species, or▪ Five or more dead or significantly injured/impaired sea mammals of any species.

19.5 Baseline Environment

19.5.1 Study Area

19. The study area for the individual hazards has been determined in relation to the impact pathways, the distances to the receptors or from examination of the scale of impacts from examples of historical incidents where available. The geographic scope may reach beyond the Bellrock WFDA and professional judgement has informed the scope of hazards with the potential for interaction with the Bellrock Wind Farm Infrastructure. The Bellrock WFDA is presented in **Figure 1.1 (Volume III)**.

19.5.2 Assumptions and Limitations

20. This assessment is based on the Project Design Envelope as set out in **Chapter 4: Project Description (Volume II)**. There were no limitations affecting this assessment.

19.5.3 Existing Environment

21. The existing environment has been characterised in the following chapters of this Bellrock WFDA EIA Report:
- **Chapter 6: Marine Geology, Oceanography and Physical Processes (Volume II);**
 - **Chapter 7: Benthic Ecology (Volume II);**
 - **Chapter 8: Fish and Shellfish Ecology (Volume II);**
 - **Chapter 9: Marine Mammal (Volume II);**
 - **Chapter 10: Offshore Ornithology (Volume II);**
 - **Chapter 11: Commercial Fisheries (Volume II);**
 - **Chapter 12: Shipping and Navigation (Volume II);**
 - **Chapter 13: Aviation and Radar (Volume II);**
 - **Chapter 14: Marine Infrastructure and Other Users (Volume II);**
 - **Chapter 15: Marine Archaeology and Cultural Heritage (Volume II);**
 - **Chapter 16: Socioeconomics, Tourism and Recreation (Volume II);**
 - **Chapter 17: Greenhouse Gas Assessment (Volume II), and**
 - **Chapter 19: Climate Change and Risk (Volume II).**
22. Future baseline for the Bellrock WFDA relevant to major accidents and disasters will evolve relating to several likely factors over the lifecycle of the Bellrock Wind Farm Infrastructure. Climate change is likely to lead to changes in rainfall and temperature, increased occurrences of extreme weather events, 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 19: Climate Change Risk (Volume II)** of this Bellrock WFDA EIA Report.

23. There are likely to be advances in technology over the lifecycle of the Bellrock Wind Farm Infrastructure, 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.
24. In terms of shipping and navigation risks, the Navigational Risk Assessment (NRA) (**Appendix 12.1 of the Bellrock WFDA EIA Report (Volume IV)**) assumes potential increases of 10 and 20% within the commercial, recreational and fishing traffic modelling. The consideration of a range of conservative values is considered as covering potential increases over the course of the operational lifespan of the Bellrock Wind Farm Infrastructure. This includes assumptions regarding offshore industries and the Aberdeen South Harbour expansion. This assessment includes consideration of the allision, collision and re-routeing cumulatively, with all effects either tolerable or broadly acceptable.

19.6 Assessment of Major Accidents and Disasters

19.6.1 Stage 1: Identification of Hazards

25. This section describes and identifies the relevant hazards deriving from the vulnerability of the Bellrock Wind Farm Infrastructure to major accidents and disasters that could lead to significant environmental effects. Hazards with the potential to cause major accidents and disasters during construction, O&M and decommissioning, affected receptors and justification for inclusion in the short list of risks for further assessment are provided in **Table 19.6**. Also included in the assessment are instances where the Bellrock Wind Farm Infrastructure increases the probability of a hazard occurring, or where the consequences of a hazard may be exacerbated by the infrastructure or activities. Hazards were identified using the NRR (HM Government, 2025), professional judgement, and a review of available literature. In relation to Shipping and Navigation, a Hazard Workshop was held in July 2025, and additional consultation with the following stakeholders:

- MCA;
- Northern Lighthouse Board (NLB);
- UK Chamber of Shipping;
- Scottish White Fish Producers Association (SWFPA);
- Royal Yachting Association Scotland;
- Montrose Port;
- Tidewater Marine; and
- Fred Olsen Cruise.

26. For the purpose of the NRA, surface piercing Bellrock Offshore Transmission Infrastructure located within the Bellrock WFDA consist only of the offshore substations (OfSSs). These were considered relevant for the Bellrock WFDA NRA in relation to hazards associated with allision risk and emergency response access on the basis that for these hazards the Bellrock WFDA layout as a whole encapsulates the floating offshore units (FOUs) (i.e. the combined WTG and floating substructure) and OfSSs. Other infrastructure within the Bellrock Offshore Transmission Development Area including interconnector cables, offshore export cables, associated protection, and any surface piercing infrastructure (i.e. reactive compensation station(s)) outside the Bellrock WFDA will be considered in a separate application, inclusive of the elements geographically located within the Bellrock WFDA.

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Table 19.6: Long List of Hazards

Hazard	Relevant for Shortlist	Justification	Receptors
Malicious Attacks			
Attacks on publicly accessible locations	No	The Bellrock Wind Farm Infrastructure is no more vulnerable to this type of hazard than any other development.	N/A
Attacks on infrastructure	No		N/A
Attacks on transport	No		N/A
Cyber attacks	No		N/A
Chemical, biological or radiological and nuclear attacks	No		N/A
Undermining the democratic process	No		N/A
Serious and Organised Crime			
Serious and organised crime - vulnerabilities	No	The Bellrock Wind Farm Infrastructure is no more vulnerable to this type of hazard than any other development.	N/A
Serious and organised crime – prosperity	No		N/A
Serious and organised crime – commodities	No		N/A
Environmental Hazards			
Coastal flooding	No	The construction, O&M and decommissioning will occur within the marine environment and will not impact on coastal flooding.	N/A
Coastal erosion	No	The construction, O&M and decommissioning works will occur within the marine environment and would not impact on coastal erosion.	N/A

Hazard	Relevant for Shortlist	Justification	Receptors
River flooding	No	Construction, O&M and decommissioning activities would occur within the marine environment and would not impact on rivers.	N/A
Surface water flooding	No	Construction, O&M and decommissioning activities would occur within the marine environment and would not impact on flood defences or flood risk.	N/A
Storms	No	<p>Damage to infrastructure from severe weather is unlikely to result in hazards with significant risk. In cases where infrastructure is damaged and WTG blades are lost to sea, this is considered unlikely to cause injury as the Bellrock Wind Farm Infrastructure will be unmanned (and maintenance would not occur in extreme weather events).</p> <p>Adverse weather conditions could damage the sks leading to mooring failure resulting in FOU loss of station or breaking free during towing operation (addressed in Bellrock WFDA Specific Hazards, below in this table).</p> <p>Risks to non-Bellrock vessels are assessed in Chapter 12: Shipping and Navigation (Volume II), including consideration of adverse weather conditions, and concluded to be tolerable or broadly acceptable and ALARP.</p>	N/A
Low temperature	No	The design of Bellrock Wind Farm Infrastructure will consider the likely range of temperatures within which it will be operated, however extremes of temperature would affect operational efficiency rather than structural integrity.	N/A
Heatwaves	No		N/A
Droughts	No	Event would have negligible consequence on the Bellrock Wind Farm Infrastructure.	N/A

Hazard	Relevant for Shortlist	Justification	Receptors
Severe space weather	No	The Bellrock Wind Farm Infrastructure is no more vulnerable to this type of hazard than any other developments.	N/A
Poor air quality	No	Event would have negligible consequence on the Bellrock Wind Farm Infrastructure.	N/A
Earthquakes/seismic activity	No	Significant earthquakes in the UK are rare, and an earthquake powerful enough to inflict severe damage is unlikely (HM Government, 2025).	N/A
Environmental disasters overseas	No	Events would not affect the Bellrock Wind Farm Infrastructure.	N/A
Wildfires	No	The Bellrock Wind Farm Infrastructure planned location is within the offshore marine environment and there would be no impact of wildfires.	N/A
Human and Animal Health			
Pandemics	No	The Bellrock Wind Farm Infrastructure is no more vulnerable to this type of hazard than any other development.	N/A
High consequence infectious disease outbreaks	No		N/A
Antimicrobial resistance	No		N/A
Animal disease	No		N/A
Major Accidents			
Widespread electricity failures	No	Events would have negligible consequence on the Bellrock Wind Farm Infrastructure.	N/A

Hazard	Relevant for Shortlist	Justification	Receptors
Major transport accidents	No	Transport (shipping) accidents discussed further under project specific hazards below.	N/A
System failures	No	Events would have negligible consequence on the Bellrock Wind Farm Infrastructure.	N/A
Commercial failures	No		N/A
Systematic financial crisis	No		N/A
Industrial accidents – nuclear	No		N/A
Major fires	Yes	Event 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 serious danger to human health to the people present in the potentially affected areas and the scale of impact.	Population and human health, biodiversity (through impacts to air quality, water quality, climate, material assets).
Societal Risks			
Industrial action	No	The Bellrock Wind Farm Infrastructure is no more vulnerable to this type of hazard than any other developments.	N/A
Widespread public disorder	No	The Bellrock Wind Farm Infrastructure is no more vulnerable to this type of hazard than any other developments.	N/A
Bellrock WFDA Specific Hazards			
Exposed cables leading to vessel snagging	Yes	Could lead to serious danger to human health with risk of loss of life and damage to Bellrock Wind Farm Infrastructure and other marine users.	Population and human health, biodiversity, and material assets.

Hazard	Relevant for Shortlist	Justification	Receptors
FOU loss of station or breaking free during towing operation	Yes	Event could lead to serious danger to human health with risk of loss of life to other marine users and damage to Bellrock Wind Farm Infrastructure. Risks of loss of station has been assessed in Chapter 12: Shipping and Navigation (Volume II) , including consideration of adverse weather conditions, and concluded to be broadly acceptable.	Population and human health, biodiversity, and material assets
Seabed conditions affecting foundations	No	Pre-construction survey will ensure that seabed conditions are suitable for anchors.	N/A
Vessel interactions (e.g. collision, allision)	Yes	Event could lead to serious danger to human health with risk of loss of life to other marine users, serious damage to the marine environment, and of damage to Bellrock Wind Farm Infrastructure.	Population and human health, biodiversity and material assets.
Aviation collision	Yes	Event could lead to serious danger to human health with risk of loss of life and damage to Bellrock Wind Farm Infrastructure and other marine users.	Population and human health, biodiversity, and material assets.
Accidental spills of hazardous material	Yes	The consequences relate to the scale of the spill and the type of hazardous material. Only large scale spills with the potential to cause serious danger to human health and to the environment are scoped in for further assessment.	Population and human health, biodiversity (through impacts to air quality, water quality, material assets).
Disturbance of unexploded ordnance (UXO) within WFDA	Yes	The event could cause serious damage to human health with risk of loss of life other marine users in addition to serious damage to the environment and damage to Bellrock Wind Farm Infrastructure.	Population and human health, biodiversity, and material assets.
Workplace accident	Yes	Risk of loss of life and damage to Bellrock Wind Farm Infrastructure and other marine users.	Population and human health, biodiversity, and material assets.

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19.6.2 Stage 2: Screening of Potential Hazards

27. Using the longlist of hazards presented in **Table 19.6**, those that could potentially affect the Bellrock Wind Farm Infrastructure or cause an accident or disaster to happen, were taken forward for further assessment and are listed in **Table 19.7**.

Table 19.7: Selected Hazards from the Longlist of Hazards

Hazard	Hazard to Potentially Affect the Bellrock Wind Farm Infrastructure	Potential for Bellrock Wind Farm Infrastructure to Cause a Hazard
Major Accidents		
Fires	√	√
Bellrock WFDA Specific Hazards		
Exposed cables leading to vessel snagging	x	√
Vessel interactions (e.g. collision, allision)	√	√
Aviation collision	√	√
Accidental spills of hazardous material	x	√
Disturbance of UXO within the Bellrock WFDA	√	√
FOU loss of station or breaking free during towing operation	√	√
Workplace accidents	x	√

19.6.3 Stage 3 and 4: Hazards Evaluation and Mitigation

28. As described in **Section 19.4**, this assessment focuses on low likelihood risks that could result in significant environmental effects. Mitigation measures for these hazards are informed by relevant chapters referenced throughout the text.

19.6.3.1 Major Fire

29. A fire in the WTG or offshore structure, caused by lightning strikes, system failures, or electrical or mechanical malfunctions, would be localised and limited to the Bellrock WFDA. Given the offshore location of the Bellrock WFDA, which limits public access and prevents the spread of fires, and with the implementation of mitigation measures, the risk of consequences meeting the threshold for applicable receptors is considered ALARP. The Emergency Response and Cooperation Plan (ERCoP) is a key strategy for managing this risk.

19.6.3.2 Exposed Cables Leading to Vessel Snagging

30. This risk of exposed cables leading to vessel snagging will be mitigated through cable burial and cable protection as described in **Chapter 4: Project Description (Volume II)**. These measures minimise cable exposure, protecting them against being damaged or snagged by the placement of anchors, accidental deposit of an object at sea or fishing activities. The mitigation measures and evaluation of the residual risk resulting from this hazard are discussed in **Chapter 12: Shipping and Navigation (Volume II)**.
31. A Cable Burial Risk Assessment (CBRA) will be developed post-consent. This is secured in the Section 36 (s.36) Consent and Marine Licence, via the requirement for a Construction Method Statement (CMS) to be developed and submitted to Scottish Ministers for approval before commencement of construction. The CBRA will set out the installation methods that will be used to mitigate environmental and navigational issues. The Applicant will use cabling burial techniques, where practicable. This will enable a reduction in the potential for interactions between other marine users and the deployed cabling infrastructure associated with the Bellrock Wind Farm Infrastructure. This is particularly important to enable the continuation of fishing activities in the locations where the cabling infrastructure has been buried. The CBRA will also highlight instances where adequate burial cannot be achieved and alternative protection is needed. Any damage, destruction, or decay of cables will be notified to MCA, NLB, Kingfisher, and United Kingdom Hydrographic Office (UKHO).
32. There are no existing third party subsea cables or pipelines within the Bellrock WFDA and therefore cable crossings with third party infrastructure is not anticipated as set out in **Chapter 14: Marine Infrastructure and Other Users (Volume II)**. There may be a requirement for the Bellrock WFDA IACs to cross each other. The Applicant will comply with all cabling industry standards in locations where the Bellrock WFDA cabling infrastructure will be buried. Cable protection will be monitored as per cable suppliers' recommendations. Further information is outlined in **Chapter 4: Project Description (Volume II)**. The risk of this hazard occurring is considered to be ALARP.

19.6.3.3 Vessel Interactions

33. This hazard is relevant to the Bellrock WFDA. The impacts, mitigation measures and evaluation of the residual risk is discussed in **Chapter 12: Shipping and Navigation (Volume II)** and **Chapter 14: Marine Infrastructure and Other Users (Volume II)** which also discusses the risk that the increased vessel movement to and from the Bellrock WFDA may pose to navigational safety during the construction and O&M phases. Further detail is also provided in **Appendix 12.1: Navigational Risk Assessment (Volume IV)**.
34. The NRA concludes that the overall risk of the Bellrock Wind Farm Infrastructure in isolation, and cumulatively with other developments, would result in no significant risks considering embedded mitigation measures in place during the construction, O&M, and decommissioning phases. The significance of risk for all hazards across the in isolation and cumulative risk assessments were predicted to be of Broadly Acceptable or Tolerable with Mitigation and ALARP assuming the implementation of the embedded mitigation measures identified.
35. **Table 19.8** lists the mitigation measures embedded into the design of the Bellrock Wind Farm Infrastructure to reduce Navigational Risk.

Table 19.8: Embedded Mitigation Measures for Navigational Risk

Embedded Mitigation Measure	Details	How the Embedded Mitigation Measures will be Secured
Compliance with international marine regulations	Project vessels will ensure compliance with international marine regulations as adopted by the Flag State, including the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) and the International Convention for the Safety of Life at Sea (SOLAS), thereby reducing the risk of navigational incidents, including vessel collisions, and associated risks to other sea users and the marine environment.	Secured in the s.36 Consent and Marine Licence via a condition requiring a Vessel Management Plan (VMP), to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An Outline Vessel Management Navigational Safety Plan (VMNSP) (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
Application for Safety Zones	An application will be made post-consent for Safety Zones including: <ul style="list-style-type: none"> ▪ An application for Safety Zones for up to 500 m around each FOU¹ during its construction; ▪ An application for Safety Zones for up to 50 m around each FOU when construction works have been completed but prior to commissioning, or where construction works are partially completed and a construction vessel is not present; ▪ An application for Safety Zones for up to 500 m around each FOU during major maintenance during operation; ▪ An application (prior to commencement of decommissioning) for Safety Zones for up to 500 m around each FOU during its decommissioning; and ▪ Consideration will also be given to an application for up to 500 m operational Safety Zones throughout the O&M phase. 	Safety Zones will be applied for under Section 95 of the Energy Act 2004 and the Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007 before commencement of construction and where required, during construction and periods of major maintenance. Secured in the s.36 Consent and Marine Licence, via a condition requiring a VMP and Navigational Safety Plan (NSP) to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An Outline VMNSP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
CBRA	A detailed CBRA will be prepared where IACs are proposed to be buried to determine the target burial depth. The burial depths may vary and will be dependent on risk and ground conditions. The CBRA will also highlight instances where adequate burial cannot be achieved, and alternative protection is needed.	Secured in the s.36 Consent and Marine Licence, via a condition requiring an Inter-array Cable Plan to be developed and submitted to the Scottish Ministers for approval before commencement of construction.

Embedded Mitigation Measure	Details	How the Embedded Mitigation Measures will be Secured
Appropriate marking on charts	All relevant Wind Farm Infrastructure ¹ will be appropriately marked on all physical and electronic nautical charts as distributed by the UKHO.	Secured in the Development Specification and Layout Plan (DSLPL) to be developed and submitted to Scottish Ministers for approval before commencement of construction.
MGN 654 Compliance	<p>The Applicant will ensure compliance with Marine Guidance Note 654 and its annexes, where applicable, including the completion post-consent of an ERCoP and a search and rescue checklist in consultation with the MCA.</p> <p>The ERCoP will ensure the implementation of response protocols in the event of emergencies for offshore activities.</p>	<p>Submitted to the Scottish Ministers for approval via the VMNSP, which will address all the recommendations of the Maritime and Coastguard Agency (MCA) in Marine Guidance Note 654 (MCA, 2021).</p> <p>An Outline VMNSP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.</p>
Compliance with floating mooring guidance	The Applicant will ensure compliance with the Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA and HSE, 2017).	<p>Secured in the s.36 Consent and Marine Licence via a condition requiring a NSP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.</p> <p>An Outline VMNSP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.</p>
Decommissioning Programme	<p>Development of, and adherence to, a Decommissioning Programme.</p> <p>The Decommissioning Programme will set out the framework for the safe, orderly, and environmentally acceptable decommissioning and removal of the Bellrock Wind Farm Infrastructure, in the interests of safety and environmental protection.</p>	Secured in the s.36 Consent and Marine Licence, via a condition requiring a Decommissioning Programme to be developed and submitted to the Scottish Ministers for approval before commencement of construction.
DSLPL	Development of and adherence to a DSLPL. A DSLPL will be developed post-consent to finalise the Bellrock WFDA layout in consultation with the MCA and NLB in accordance with s.36 Consent and Marine Licence requirements.	Secured in the s.36 Consent and Marine Licence, via a condition requiring a DSLPL to be developed and submitted to the Scottish Ministers for approval before commencement of construction.
Fisheries liaison	Ongoing liaison with commercial fishing interests will be maintained throughout construction, O&M, and decommissioning of the Bellrock Wind Farm Infrastructure. A dedicated Fisheries Liaison Officer will	Secured in the s.36 Consent and Marine Licence via a condition requiring a Fisheries Mitigation, Monitoring and Communication Plan and a condition requiring the appointment of a Fisheries Liaison

Embedded Mitigation Measure	Details	How the Embedded Mitigation Measures will be Secured
	<p>be appointed during the construction phase. During O&M and decommissioning, appropriate fisheries liaison arrangements will be maintained, including the appointment of a Fisheries Liaison Officer, if required.</p>	<p>Officer to be developed and submitted to the Scottish Ministers for approval before commencement of construction.</p> <p>The Fisheries Mitigation, Monitoring and Communication Plan (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.</p>
Guard vessels	<p>Where appropriate, guard vessels (or other suitable methods) will be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, O&M, and decommissioning phases.</p>	<p>Secured in the s.36 Consent and Marine Licence, via a condition requiring a VMP and NSP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.</p> <p>An Outline VMNSP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.</p>
Lighting and marking	<p>Lights, marks, sounds, signals, and other aids to navigation will be exhibited as required by NLB, MCA, and the Civil Aviation Authority including the buoyed construction/decommissioning areas.</p>	<p>Secured in the s.36 Consent and Marine Licence via a condition requiring a Lighting and Marking Plan (LMP) to be developed and submitted to the Scottish Ministers for approval before commencement of construction.</p> <p>An Outline LMP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.</p>
Marine coordination	<p>Marine coordination will be implemented to manage project vessels throughout construction, O&M, and decommissioning periods, including in liaison with relevant ports and harbours.</p>	<p>Secured in the s.36 Consent and Marine Licence via a condition requiring a VMP and NSP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.</p> <p>An Outline VMNSP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.</p>
Marine Pollution Contingency Plan (MPCP)	<p>Development of and adherence to a MPCP outlining the approach for managing and reducing risk of pollution and procedures to protect personnel and to be followed in the event of a pollution incident.</p>	<p>Secured in the s.36 Consent and Marine Licence, via a condition requiring a MPCP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.</p>

Embedded Mitigation Measure	Details	How the Embedded Mitigation Measures will be Secured
		A MPCP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
VMNSP	Development of, and adherence to, a VMNSP. The VMNSP will describe measures put in place by the Applicant related to navigational safety, including information on Safety Zones, charting, construction buoyage, temporary lighting and marking, and means of notification of activity at the Bellrock WFDA to other sea users (e.g. via Notice to Mariners with Kingfisher Bulletins or other appropriate methods). Where appropriate, guard vessels will be used to ensure adherence with Safety Zones or advisory passing distances.	Secured in the s.36 Consent and Marine Licence via a condition requiring a VMP and NSP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An Outline VMNSP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
Minimum blade clearance	For all FSS designs (semi-submersible platform and barge that move with the tide and tension leg platform FSS design, which is restrained by tensioned moorings and does not notably move with the tide), the air gap will be maintained relative to the sea surface and will be minimum 22 m above all tidal levels. This project design envelope will therefore encompass the minimum 22 m air gap above mean high water springs required by the MCA.	Secured in the s.36 Consent and Marine Licence, via a condition requiring a CMS and DSLP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.
<p>Notes:</p> <p>¹ The embedded mitigation measures identified within the Navigational Risk Assessment have been developed with respect to the Bellrock Wind Farm Infrastructure and surface piercing Bellrock Offshore Transmission Infrastructure located within the Bellrock WFDA. Accordingly, the offshore substations, part of the Offshore Transmission Infrastructure, were considered within the Navigational Risk Assessment in relation to navigational hazards including vessel allision risk and emergency response access, on the basis that the assessed Bellrock WFDA layout encapsulates such infrastructure. However, the offshore substations do not form part of the Bellrock Wind Farm Infrastructure s.36 Consent and Marine Licence applications and will be consented separately under the Bellrock Offshore Transmission Infrastructure Marine Licence application. Mitigation and monitoring measures relevant to the offshore substations are therefore not included within this register and will be secured through the Bellrock Offshore Transmission Infrastructure consenting process.</p>		

36. Adherence to the **MPCP (Volume V)** and to the ERCoP which will be completed post-consent in consultation with the MCA, will aid in managing the risk to the environment and personnel. The ERCoP will include a response flow chart and detail how to report and respond to an environmental incident, including the measures available to contain/clean up an incident, manage accidental deposit of an object at sea and offsite emergency response resources.
37. In terms of shipping and navigation risks, **Appendix 12.1: Navigational Risk Assessment (Volume IV)** includes consideration of the potential allision, collision and re-routing both for the Bellrock WFDA- alone and cumulatively. All risks are assessed as ALARP.

19.6.3.4 Aviation Collision

38. The impacts, mitigation measures and evaluation of the residual risk is discussed in **Chapter 13: Aviation and Radar (Volume II)** in addition to mitigation to avoid impacts upon aviation including:
- Development and adherence to an LMP;
 - Development and adherence to an ERCoP;
 - Compliance with compliance with MGN 654 and requirements for SAR;
 - Appropriate marking of the Bellrock Wind Farm Infrastructure on aeronautical charts; and
 - Helicopter main routing.
39. With the agreement and implementation of suitable mitigation the risk from aviation collision is considered ALARP.

19.6.3.5 Accidental Spills of Hazardous Material

40. During construction, O&M, and decommissioning the use of fuels will be required, oils and lubricants may be required, as discussed in **Chapter 4: Project Description (Volume II)**. Accidental spills of these substances have the potential to occur as a result of the Bellrock Wind Farm Infrastructure.
41. The Applicant will commit to undertaking construction and O&M works in adherence with relevant good practice guidance and legislation. The Applicant will also prepare all necessary plans in advance of construction and O&M activities. 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 following outlined plans are submitted alongside this s.36 Consent and Marine License application:
- **Marine Pollution Contingency Plan (Volume V);** and
 - **Outline Environment Management Plan (Volume V).**
42. These plans include measures for management of accidental spills, addressing all potential contaminant releases and include key emergency contact details and personnel training and competences.

43. The MPCP set out for approval, the management measures to be implemented during construction, O&M, and decommissioning to mitigate the risks of accidental spills of hazardous materials into the environment.
44. The MPCP will also detail measures to reduce instances of spills, remedial action, and response measures to be used in the event of a spill for both vessel refuelling at sea and equipment refuelling operations. These measures will be implemented by all Contractors and Subcontractors, under the management of a Marine Coordinator, in addition to control measures for potential spill scenarios during construction, and O&M phases.
45. These measures will prevent a release of hazardous material of a scale large enough to meet the thresholds set out in **Table 19.5** for the affected receptors and the risk is considered to be ALARP.

19.6.3.6 Disturbance of UXO within the Bellrock WFDA

46. Based on the historical records led risk assessment the overall risk rating for UXO in the Bellrock WFDA is rated low (6 Alpha Associates, 2023).
47. Prior to the commencement of construction, geophysical surveys to inform the presence of UXO will be undertaken during the site preparation phase (as part of site preparation works). In case UXO clearance is required at any time, the hierarchy of UXO mitigation and clearance techniques that will be adopted for the Bellrock WFDA, in order of preference, is:
 - Avoid (through micro-siting of infrastructure);
 - Move UXO without clearing it (if applicable and accepted as an option);
 - Remove the UXO without clearing it (if applicable and accepted as an option);
 - Low-order clearance, such as deflagration (if above options not suitable/unsafe); and
 - High-order clearance (if above options not suitable/unsafe) or in the event that low-order deflagration was unsuccessful after a minimum of three attempts, as per the guidance contained within the Marine Environment: UXO clearance Joint Position Statement (UK Government, 2025).
48. With the relevant mitigation measures in place, the risk of a major accident occurring due to this hazard is determined to be ALARP.

19.6.3.7 Breaking Free During Towing Operation

49. As described in **Chapter 4: Project Description (Volume II)**, the FOU will be towed from the integration port or wet storage facility to the Bellrock WFDA by suitable vessels (tug/anchor handlers and support vessels) and connected to the pre-installed sks utilising a range of suitable vessels (i.e. tug/anchor handlers, and CSVs and/or other types of support vessels). Final ballasting operations will take place either immediately prior to final positioning, or when the FOU is in its final position, ensuring the FOU and all systems are in a safe state prior to being disconnected from the vessels.
50. The operation of towing the FOUs, to and from the Bellrock WFDA, could take place during construction, during O&M for major maintenance or decommissioning. Towing operations are very

sensitive to the weather, due to waves and wind interactions with the structures. In addition, ballasting operations taking place in open ocean introduce a relatively new risk factor, when compared with other sectors, but should not represent significant concern (Energy Institute, 2022).

51. Should a towage operation fail (most likely in adverse weather conditions when such operations are less likely to proceed), the FOU could drift into areas of high vessel density increasing collision risk. Towage of FOU's will be subject to a dedicated risk assessment at the time of the towage operation when full specifications relating to the operation are available and this will include consideration of upcoming MCA guidance relating to towage requirements for offshore floating structures. Various provisions are required under regulatory expectations including provision of emergency tow lines to reconnect towage vessels in the event of main tow line failure.
52. Any issues during tows of FOU's to and from the Bellrock WFDA (either during construction, O&M or decommissioning) as a result of vessel breakdowns, for example, would be mitigated by existing procedures relating to shipping and navigation listed in **Table 19.8**, the most relevant being **Outline VMNSP (Volume V)** and Project vessel compliance with international marine regulations.
53. With the relevant mitigation in place the risk from a FOU breaking free during towing operation is considered ALARP.

19.6.3.8 Floating Offshore Unit Loss of Station

54. **Chapter 12: Shipping and Navigation (Volume II)** and **Appendix 12.1: Navigational Risk Assessment (Volume IV)** inform that FOU breaking free of its moorings is considered to be a negligible frequency event. Noting that for a total loss of station, all moorings would be required to fail. If possible, redundancy will be built into the skss, allowing some mooring lines to fail without the FOU losing station. The assessment of this risk concluded it would be broadly acceptable and tolerable with mitigation and ALARP assuming the implementation of the embedded mitigation measures for all development phases of the Bellrock WFDA.
55. A series of provisions are required under regulatory expectations including for example:
 - Third party verification by an independent and competent body of the mooring systems to ensure they meet the required standards; and
 - Provision of continuous monitoring either by Global Positioning System (GPS) or other suitable means.
56. Procedures for emergency situations will be detailed in an ERCoP that will be subject to approval from the MCA and the NLB.
57. With the relevant mitigation in place the risk from a FOU loss of station is considered ALARP.

19.6.3.9 Workplace Accidents

58. 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.

59. During the construction and O&M phase, the **ERCoP** will detail protocols that will be undertaken in the event of an emergency, including occupational health and safety, and set out clear roles and responsibilities, emergency contacts and reporting and escalation pathways. Protocols for extreme weather events will also be included.
60. The **CMS** and **Decommissioning Plan (PD)** will also provide a clear outline of roles and responsibilities and reference to health and safety protocols to ensure occupational health and safety standards are maintained respectively during construction and decommissioning.
61. With all of the above in place, the risk from workplace accidents is considered to be ALARP.

19.6.4 Summary

62. **Table 19.9** presents the summary of the assessment of the effects of the Bellrock Wind Farm Infrastructure to Major Accidents or Disaster in accordance with the Bellrock WFDA Scoping Opinion (see **Appendix 1.2: Bellrock Wind Farm Development Area Scoping Opinion (Volume IV)**) and ISEP² current guidelines (IEMA, 2020).
63. Considering the implementation of the mitigation measures in place, the effects on receptors are managed and/or mitigated to an acceptable level and therefore no likely significant effects are expected as a result of Major Accidents or Disaster affecting or caused by Bellrock Wind Farm Infrastructure.

² ISEP formerly known as IEMA

Table 19.9: Summary of the Assessment of the Effects of the Bellrock Wind Farm Infrastructure to Major Accident or Disaster

Risk Event	Source/Pathway	Relevant Project Phase(s)	Source Document/Chapter	Receptor(s)	Reasonable Worst Scenario if Event did Occur	Embedded Commitments to Mitigate Risk	Could this Reasonably Lead to a Major Accident and/or Disaster with Existing Control Measures in Place?	Is the Reasonable Worst Consequence Managed to an Acceptable Level with Existing Control Measures in Place?	If No, What Secondary Control Measures are Required to Reach and Acceptable Level?	Conclusion
Major Fire ^{1 2}	Caused by lightning strikes, system failures, or electrical or mechanical malfunctions	<ul style="list-style-type: none"> O&M 	Scoping Report	Population and human health	Multiple WTG affected injury to workers, other sea users	ERCoP	No	Yes	Not required	Managed to ALARP, no likely significant effects expected
Exposed cables leading to vessel snagging ²	IACs being damaged or snagged by the placement of anchors, dropped objects or fishing activities	<ul style="list-style-type: none"> O&M 	Scoping Report	Population and human health	Injury of other sea users and or associated loss or damage of fishing gear	CBRA LMP Compliance with MGN 654	No	Yes	Not required	Managed to ALARP, no likely significant effects expected
Vessel allision/collision ^{1 2}	Increased vessel movement to and from the site may pose to navigational safety	<ul style="list-style-type: none"> Construction O&M and Decommissioning 	Chapter 12: Shipping and Navigation (Volume II) Appendix 12.1: Navigational Risk Assessment (Volume IV)	Population and human health	Injury of other sea users associate and or associated damage or loss of vessel or equipment	VMNSP	No	Yes	Not required	Managed to ALARP, no likely significant effects expected
Aviation collision ^{1, 2}	Increased numbers of flights	<ul style="list-style-type: none"> Construction O&M and Decommissioning 	Chapter 13: Aviation and Radar (Volume II)	Population and human health	Injury of people and associated damage or loss of aircraft	ERCoP LMP Compliance with MGN 654	No	Yes	Not required	Managed to ALARP, no likely significant effects expected
Accidental spills of hazardous material ²	Accidental spills of these substances during refuel of equipment	<ul style="list-style-type: none"> Construction O&M and Decommissioning 	Chapter 4: Project Description (Volume II)	Marine Environment Population and human health	Contamination of the marine environment injury or intoxication of people	MPCP EMP	No	Yes	Not required	Managed to ALARP, no likely significant effects expected
Disturbance of UXO in the WFDA ^{1, 2}	Encounter of UXO in areas where marine works are to be carried out	<ul style="list-style-type: none"> Construction O&M 	Chapter 4: Project Description (Volume II)	Marine Environment Population and human health	Explosive noise generation	ERCoP	No	Yes	Not required	Managed to ALARP, no likely significant effects expected
FOU loss of station and breaking free during tow ^{1, 2}	Towing and/or mooring line failure	<ul style="list-style-type: none"> Construction O&M and Decommissioning 	Chapter 12: Shipping and Navigation (Volume II) Appendix 12.1: Navigational Risk Assessment (Volume IV)	Population and human health	Risk of allision/collision to other sea users	VMNSP LMP Compliance with MGN 654	No	Yes	Not required	Managed to ALARP, no likely significant effects expected

Risk Event	Source/Pathway	Relevant Project Phase(s)	Source Document/Chapter	Receptor(s)	Reasonable Worst Scenario if Event did Occur	Embedded Commitments to Mitigate Risk	Could this Reasonably Lead to a Major Accident and/or Disaster with Existing Control Measures in Place?	Is the Reasonable Worst Consequence Managed to an Acceptable Level with Existing Control Measures in Place?	If No, What Secondary Control Measures are Required to Reach and Acceptable Level?	Conclusion
Workplace accidents ²	Human error	<ul style="list-style-type: none"> ▪ Construction ▪ O&M 		Population and human health	Injury to people	Adequate qualifications, training and regular project specific information (e.g. toolbox talks)	No	Yes	Not required	Managed to ALARP, no likely significant effects expected
<p>Notes:</p> <p>¹ Vulnerability of the Bellrock WFDA to Existing Accidents/Disasters.</p> <p>² Potential for the Bellrock WFDA to Cause Accidents/Disasters.</p>										

19.7 Transboundary, Inter-related and Cumulative Impact Assessment

64. Hazards discussed within this assessment would mainly result in effects restricted to the Bellrock WFDA, and therefore no transboundary effects are expected.
65. As described in **Sections 19.6.3.7** and **19.6.3.8** the towing of FOU's to be connected to pre-installed skss and the assessment considers the risk of structures breaking free during these operations. There is potential for the construction period of the Bellrock Wind Farm Infrastructure to overlap with the construction of other Scottish offshore wind farm projects in the vicinity. However, the closest floating offshore wind projects are at least 8 km from the Bellrock WFDA, and therefore no cumulative risk for this hazard is expected.
66. Additionally, this hazard risk would also be minimised through the adoption of industry good practices and adherence to safety measure such as:
- Compliance with COLREGS;
 - Implementation of VMNSP; and
 - LMP.
67. Therefore, no cumulative risk for this hazard with other developments, are expected.

19.8 Conclusions

68. The assessment of Major Accidents and Disasters for the Bellrock WFDA has been based on desktop review informed by the following chapters:
- **Chapter 6: Marine Geology, Oceanography and Physical Processes (Volume II);**
 - **Chapter 7: Benthic Ecology (Volume II);**
 - **Chapter 8: Fish and Shellfish Ecology (Volume II);**
 - **Chapter 9: Marine Mammals (Volume II);**
 - **Chapter 10: Offshore Ornithology (Volume II);**
 - **Chapter 11: Commercial Fisheries (Volume II);**
 - **Chapter 12: Shipping and Navigation (Volume II);**
 - **Chapter 13: Aviation and Radar (Volume II);**
 - **Chapter 14: Marine Infrastructure and Other Users (Volume II);**
 - **Chapter 15: Marine Archaeology and Cultural Heritage (Volume II);**
 - **Chapter 16: Socioeconomics, Tourism and Recreation (Volume II);**

- **Chapter 17: Greenhouse Gas Assessment (Volume II);** and
- **Chapter 18: Climate Change Risk (Volume II).**

69. The description and identification of the likely significant effects (LSE) deriving from the vulnerability of the Bellrock Wind Farm Infrastructure to major accidents and disasters is presented in **Section 19.6.1 (Stage 1: Identification of Hazards)**.
70. Hazards considered for further assessment for the Bellrock Wind Farm Infrastructure are presented in **Section 19.6.2 (Stage 2: Screening of Potential Hazards)**, and the evaluation and mitigation of the hazards considered are detailed in **Section 19.6.3 (Stage 3 and 4: Hazards Evaluation and Mitigation)**.
71. The proposed mitigation measures embedded into the construction, O&M and decommissioning phases of the Bellrock Wind Farm Infrastructure, alongside the adherence to industry safety standards, will reduce all risks to ALARP. 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 planned for the Bellrock Wind Farm Infrastructure are expected to pose an appreciable risk of major accidents or disasters.

19.9 References

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