



# **Bellrock Offshore Wind Farm**

## **Wind Farm Development Area**

**Environmental Impact Assessment Report - Volume VII**

**Report to Inform Nature Conservation Marine Protected Area Assessment**

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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 the Bellrock Offshore Wind Farm Development Area.
Assembly port	A port at which floating substructures are assembled.
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"> <li>▪ Wind Farm Development Area;</li> <li>▪ Offshore Transmission Development Area; and</li> <li>▪ Onshore Transmission Development Area.</li> </ul>
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.
Construction port	Port that may be used during the construction of the Wind Farm Infrastructure and includes integration port(s) and assembly port(s).
Construction works	<p>Works to install the Wind Farm Infrastructure as authorised by the Wind Farm Development Area Section 36 Consent/Marine Licence, such as:</p> <ul style="list-style-type: none"> <li>▪ Site preparation works undertaken after commencement of construction;</li> <li>▪ Pre-installation surveys (intrusive and/or non-intrusive);</li> <li>▪ Placement on or installation in the seabed of anchors and associated scour protection, and mooring lines, and associated scour protection;</li> <li>▪ Towing or transportation of the floating offshore unit to the Wind Farm Development Area from a port or wet storage facility;</li> <li>▪ Floating offshore unit installation and commissioning, including hooking-up to the pre-installed mooring system;</li> <li>▪ Trench excavation for inter-array cables;</li> <li>▪ Laying of inter-array cables in or on the seabed and, associated cable protection;</li> <li>▪ Installation of subsea cable hubs, including placing of associated foundation;</li> <li>▪ Final commissioning following cable connections and snagging; and</li> <li>▪ Post installation surveys.</li> </ul>
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"> <li>▪ Wind Farm Development Area;</li> <li>▪ Offshore Transmission Development Area; and</li> <li>▪ Onshore Transmission Development Area.</li> </ul>
Dynamic inter-array cable	The section of inter-array cable between the floating substructure and the seabed, which is designed to accommodate the dynamic movement of the floating substructure.

<b>Term</b>	<b>Definition</b>
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.
Integration port	A port at which wind turbine generators are integrated with floating substructures.
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.
National Electricity Transmission System	The high-voltage electricity power transmission network serving Great Britain which receives electricity from generators (such as offshore wind farms) and transmits that electricity to anywhere on the National Electricity Transmission System to satisfy demand.
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 Development Area	The boundary within which the Offshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned (and includes the whole of the Wind Farm Development Area).
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).
Onshore Transmission Development Area	The boundary within which the Onshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned.
Onshore Transmission Infrastructure	Infrastructure located within the Onshore Transmission Development Area including transition joint bay(s); onshore export cables; onshore substation; temporary construction compounds; temporary working areas; environmental mitigation areas; drainage/irrigation infrastructure; access works; and any other associated infrastructure (including activities associated with the Onshore Transmission Infrastructure construction, operation and maintenance, and decommissioning).
Operations and maintenance port	Port that may be used in the operations and maintenance phase of the Wind Farm Development Area and mainly comprises of a day-to-day operation and maintenance port and other port(s) required for major maintenance.
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.
Ramp-up	Ramp-up follows on from the soft-start piling procedure. It comprises a specified minimum period of piling, starting at the highest low-energy blow level achieves in the soft start and gradually increasing in hammer energy. The maximum hammer energy required (operational power for that specific pile) must not be reached within the ramp-up period.

<b>Term</b>	<b>Definition</b>
ScotWind	A Crown Estate Scotland leasing round for offshore wind projects in which the process enabled developers to apply for seabed rights to plan and build wind farms in Scottish waters.
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"> <li>▪ Geophysical surveys, geotechnical surveys, and non-archaeological/archaeological diver/remotely operated vehicle surveys;</li> <li>▪ Seabed preparation including sand wave levelling, slope levelling for gravity based anchors (if selected), boulder clearance, and pre-lay grapnel runs;</li> <li>▪ Unexploded ordnance survey and/or clearance;</li> <li>▪ Debris clearance; and</li> <li>▪ Out of service cable/pipeline removal.</li> </ul>
Soft start	The procedure used to commence piling at a low hammer energy. The soft start procedure consists of low-energy blows which are followed by the ramp-up procedure.
Static inter-array cable	The section of inter-array cable that is not designed to move.
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.
Subsea cable hub	A subsea device, with a gravel pad foundation, which allows the connection of multiple inter-array cables.
Towing	Transportation of a floating offshore unit or floating substructure between a port, and/or wet storage facility and/or the Wind Farm Development Area.
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

<b>Term</b>	<b>Definition</b>
ADD	Acoustic deterrent device
CEA	Cumulative effects assessment
dB re 1 $\mu\text{Pa}^2\text{s}$	Decibels relative to 1 micropascal squared second
EDR	Effective deterrence range
FOU	Floating offshore unit
FSS	Floating substructure
JNCC	Joint Nature Conservation Committee
Kg	Kilogram
Km <sup>2</sup>	Square kilometres
ncMPA	Nature Conservation Marine Protected Area
NEQ	Net explosive quantity
O&M	Operation and maintenance
OFTDA	Offshore Transmission Development Area
PTS	Permanent threshold shift
RIMPAA	Report to Inform Nature Conservation Marine Protected Area Assessment
SEL <sub>cum</sub>	Cumulative sound exposure level
SEL <sub>ss</sub>	Single strike sound exposure level
SMWWC	Scottish Marine Wildlife Watching Code
SPL <sub>peak</sub>	Peak sound pressure level
TTS	Temporary threshold shift
UWN	Underwater noise
UXO	Unexploded ordnance
VMNSP	Vessel Management and Navigational Safety Plan
WFDA	Wind Farm Development Area

# 1 Introduction

1. Bellrock Offshore Wind Farm Limited (the Applicant) is developing the Bellrock Offshore Wind Farm (the Bellrock Project).
2. In January 2022, the Applicant was successfully awarded development rights for an area of seabed (the Bellrock Wind Farm Development Area (WFDA)), to develop the Bellrock Wind Farm Infrastructure, which forms part of the Bellrock Project.
3. The Bellrock Project is a proposed floating offshore wind farm which will generate and transmit renewable electricity to the National Electricity Transmission System. The Bellrock Project comprises the following three Development Areas for which separate consents and/or licences will be sought by the Applicant:
  - The Bellrock WFDA within which the Wind Farm Infrastructure will be constructed, operated and maintained, and decommissioned;
  - The Bellrock Offshore Transmission Development Area (OfTDA) within which the Offshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned; and
  - The Bellrock Onshore Transmission Development Area, within which the Onshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned.
4. This Report to Inform Nature Conservation Marine Protected Area (ncMPA) Assessment (RIMPAA) has been submitted to Marine Directorate - Licensing and Operations Team alongside the Bellrock WFDA EIA Report in support of the consent applications for the Bellrock Wind Farm Infrastructure.

## 2 Purpose of this Report

5. Sites designated as ncMPAs within Scottish waters are established for the protection of nationally important marine habitats, species, and geodiversity features under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 (please see **Section 3** for further detail on the legislative context of ncMPAs).
6. The purpose of this report is to assess the potential for the Bellrock Wind Farm Infrastructure to significantly hinder the achievement of the conservation objectives of the relevant ncMPAs. This report focuses on the Southern Trench ncMPA, which is located approximately 94 km to the northwest of the Bellrock WFDA (**Figure A.1 (Appendix A)**). The Southern Trench ncMPA is the only site screened in for further assessment in the Bellrock WFDA ncMPA Screening Report (see **Section 6.1** for details). This report is structured as follows:
  - **Section 1** – Introduction: This section provides an overview of the Bellrock Project;
  - **Section 2** – Purpose of this Report: This section details the purpose of this report and what the information provided within aims to achieve;
  - **Section 3** – Legislative Context: This section details the legislative requirements for undertaking a ncMPA assessment;
  - **Section 4** – Consultation: This section provides a comprehensive summary of all consultation received relevant to the ncMPA assessments and the Southern Trench ncMPA;
  - **Section 5** – Embedded Mitigation Measures: This section details the embedded mitigation measures that are relevant to this RIMPAA;
  - **Section 6** – Screening Summary: This section provides a summary of the Bellrock WFDA ncMPA Screening Report (**Appendix 1.1: Bellrock Wind Farm Development Area Scoping Report (Volume IV)**);
  - **Section 7** – Main Assessment – Methodology: This section details the main assessment methodology that has been used to undertake the main assessment within this report;
  - **Section 8** – Overview of the Bellrock Wind Farm Infrastructure: This section provides a summary of the Bellrock Wind Farm Infrastructure;
  - **Section 9** – Southern Trench Nature Conservation Marine Protected Area: This section provides a summary of the baseline condition of the Southern Trench ncMPA, and in particular the minke whale *Balaenoptera acutorostrata* feature;
  - **Section 9.3** – Main Assessment – Bellrock WFDA Alone: This section presents the main assessment of the Bellrock Wind Farm Infrastructure;
  - **Section 9.4** – Main Assessment – Cumulative Effect Assessment: This section presents the cumulative assessment of the Bellrock Wind Farm Infrastructure;
  - **Section 10** – Conclusion: This section presents the conclusions of this report; and
  - **Appendix A** – Figures: This appendix details relevant figures that have been referenced throughout this report.

## 3 Legislative Context

7. The Southern Trench ncMPA is located within the Scottish inshore region and is designated under the Marine (Scotland) Act 2010, with associated duties placed on public authorities determining applications for marine authorisations.
8. Under Section 83 of the Marine (Scotland) Act 2010, where a public authority is determining an application for authorisation of an act that is capable of affecting, other than insignificantly, a protected feature of a ncMPA, or any ecological or geomorphological process on which the conservation of any protected feature in a ncMPA depends (in whole or in part), the authority must consider whether there is a significant risk that the act would hinder the achievement of the stated conservation objectives of the ncMPA.
9. Where the public authority considers that there is, or may be, a significant risk of hindering the achievement of the conservation objectives of an ncMPA, it is required to notify the Scottish Ministers and NatureScot, and to take account of any relevant advice or guidance provided, prior to determining the application.
10. In accordance with Section 83(4) of the Marine (Scotland) Act 2010, the public authority must not grant authorisation for the proposed act unless either:
  - It is satisfied that there is no significant risk of the act hindering the achievement of the stated conservation objectives of the ncMPA; or
  - Where such a conclusion cannot be reached, it is satisfied that:
    - There are no alternative means of proceeding with the act which would create a substantially lower risk of hindering the achievement of the conservation objectives, including proceeding in another manner or at a different location;
    - The benefit to the public of proceeding with the act clearly outweighs the risk of damage to the environment that will be created by proceeding with it; and
    - Measures of equivalent environmental benefit will be undertaken, or arrangements made for the undertaking of such measures, in relation to the damage which the act will, or is likely to, have in or on the ncMPA.
11. For completeness, it is noted that equivalent statutory duties are set out under Section 126 of the Marine and Coastal Access Act 2009, which applies to ncMPAs designated in Scottish offshore waters beyond 12 nautical miles from the coast. The decision making tests under Section 126 are materially equivalent to those set out in Section 83 of the Marine (Scotland) Act 2010, requiring consideration of whether an act would pose a significant risk of hindering the achievement of the conservation objectives of an ncMPA, and, where such risk cannot be excluded, the application of test relating to alternatives, public benefit, and measures of equivalent environmental benefit.

## 4 Consultation

12. Consultation has been undertaken with relevant statutory consultees as part of the scoping process to inform the scope and approach of this RIMPAA. This section summarises the comments received during scoping that are relevant to this assessment and identifies where and how those comments have been addressed within this report. A summary of the scoping responses and the corresponding actions taken is provided in **Table 4.1**.

**Table 4.1: Summary of Scoping Advice Relevant to this Report to Inform Nature Conservation Marine Protected Area Assessment**

Consultee	Date/Document	Comment Received	Action Taken
Marine Directorate - Licensing and Operations Team	Bellrock WFDA Scoping Opinion (2024), Paragraph 5.5.8	In regard to the MPA Screening Report, the Scottish Ministers refer to the representation from NatureScot and are generally content with the proposed impacts to be scoped in and out for minke whale.	Noted. Please see responses to NatureScot representations in this table.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	Appendix 2 - Nature Conservation Marine Protected Area Screening, provides an initial screening of ncMPA sites to be taken through to assessment, which will be presented as a standalone report alongside the Bellrock WFDA EIA Report.	Noted. This report presents the main assessment undertaken in relation to the screened in ncMPAs, in this case the Southern Trench ncMPA.  <b>Sections 9.3 and 9.4</b> present the main assessment for project alone and cumulative effects, respectively.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	NatureScot note that several ncMPAs designated for non-migratory fish and shellfish are also included in Table 7.6, on the basis of a 75 km Zone of Influence to account for a worst case noise impact range (as outlined in Appendix 2 - NCMPA Screening Report).  NatureScot also note that on Page 176, both the East of Gannet and Montrose Fields ncMPA and the Firth of Forth Banks Complex ncMPA are to be screened out of the NCMPA assessment. Furthermore, in Section 1.3.2 of Appendix 2 (paragraph 28) it is stated that NCMPAs designated for fish and shellfish are screened out of further assessment. NatureScot advise that are content with the conclusion reached, as outlined in paragraph 27.	Noted. Please see <b>Section 6</b> for a summary of the screening conclusions in relation to which ncMPAs and impact pathways have been brought forward for further assessment.
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	NatureScot note that the Southern Trench ncMPA is also included in Table 7.6, although not designated for fish or shellfish, these receptors are prey for the designated minke whale feature. Under this reasoning, Table 7.6 notes that the Southern Trench ncMPA has been scoped in for further assessment. Within Table 2.1 of Appendix 2 - NCMPA Screening Report, it is noted that changes to prey availability will not be considered for minke whale in the ncMPA main assessment.  NatureScot advise that the Southern Trench ncMPA does not need to be considered further in terms of changes in prey availability on the minke whale qualifying feature, due to the distance from the site.	Noted. As detailed in <b>Section 6</b> the impact pathway relating to changes to prey availability has been scoped out of further assessment.

Consultee	Date/Document	Comment Received	Action Taken
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	<p>NatureScot note that the minke whale qualifying feature of the Southern Trench ncMPA is the only feature/site screened in for further assessment in the NCMPA main assessment.</p> <p>NatureScot advise that they are content with this as there may be overlap from noise contours from piling and/or UXO clearance. Until noise modelling is undertaken the distance that sound will propagate is not known.</p>	<p>Noted. Underwater noise (UWN) modelling has now been undertaken and is presented in <b>Appendix 9.2: Underwater Noise Modelling Report (Volume IV)</b>. The conclusions of the UWN modelling have been used to review and update the impact pathways to be considered in the main assessment. The results of this updated impact pathway screening exercise are presented in <b>Section 6</b>.</p>
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	<p>NatureScot note that, alongside potential underwater noise impacts from UXO and substructure installation, 'Underwater noise and presence of vessels' and 'collision risk with vessels' are also included within Table 2.1 for further consideration within the main assessment. These potential impacts are to be considered across construction, operation and maintenance, and decommissioning phases. NatureScot assume that impacts related to vessels are included for further assessment as ports and storage locations are yet to be confirmed - further clarification is required.</p>	<p>The impact pathways relating to the presence of vessels and associated UWN<sup>1</sup> and collision risk with vessels are considered in the main assessment (<b>Sections 9.3 and 9.4</b>) due to the potential for vessels to transit through the Southern Trench ncMPA on route to and from the Bellrock WFDA.</p>
NatureScot	Representation on the Bellrock WFDA Scoping Report (2024)	<p>Noting the comments above, NatureScot consider that all other potential impacts listed in Table 2.1 can be screened out from the Bellrock WFDA NCMPA main assessment.</p> <p>For ncMPAs, connectivity is determined if the proposed development has the potential to impact the qualifying feature within the site boundary only.</p>	<p>Noted. Please see <b>Section 6</b> for a summary of the ncMPAs and impact pathways to be considered in the main assessment.</p> <p>Impact pathway screening has been updated based on the conclusions of UWN modelling (<b>Appendix 9.2: Underwater Noise Modelling Report (Volume IV)</b>).</p>
<p>Notes:</p> <p><sup>1</sup> The impact pathway title has been updated from "UWN and presence of vessels", as used in the ncMPA Screening Report (<b>Appendix 1.1: Bellrock Wind Farm Development Area Scoping Report (Volume IV)</b>), to "Presence of vessels and associated UWN" for clarity of presentation.</p>			

## 5 Embedded Mitigation Measures

13. Mitigation measures relevant to minke whale have been defined, assessed, and embedded within the design and assessment of the Bellrock Wind Farm Infrastructure through **Chapter 9: Marine Mammals (Volume II)** of the Bellrock WFDA EIA Report. These measures are relied upon in the main assessment (**Section 9.3** and **9.4**) presented in this report.
14. Embedded mitigation relevant to the Southern Trench ncMPA includes, but is not limited to:
  - The development of, and adherence to, a Marine Mammal Mitigation Protocol;
  - The development of, and adherence to, a Piling Noise Mitigation Plan including the implementation of soft-start and ramp-up measures for piling; and
  - The development of, and adherence to, a Vessel Management and Navigational Safety Plan (VMNSP).
15. Full details of these mitigation measures are provided in Section 9.7.3 of **Chapter 9: Marine Mammals (Volume II)** of the Bellrock WFDA EIA Report.

## 6 Screening Summary

### 6.1 Overview of Site-level Screening Conclusions

16. The ncMPA Screening Report was submitted alongside the Bellrock WFDA Scoping Report as Appendix 2: Nature Conservation Marine Protected Area Screening Report (**Appendix 1.1: Bellrock Wind Farm Development Area Scoping Report (Volume IV)**). That screening exercise undertook a site-level assessment to identify ncMPAs with the potential to be affected by the Bellrock Wind Farm Infrastructure.
17. The site-level screening identified the Southern Trench ncMPA as the only ncMPA with the potential to be affected and therefore requiring further consideration. All other ncMPAs were screened out at the site level on the basis that no plausible impact pathways were identified. These conclusions were supported by the Scoping Opinion (**Appendix 1.2 Bellrock WFDA Scoping Opinion (Volume IV)**) and remain unchanged and form the basis for assessment presented in this report.

### 6.2 Summary of Initial Impact Pathway Screening

18. The initial screening of potential impact pathways for the Southern Trench ncMPA considered a range of potential impact pathways associated with the Bellrock Wind Farm Infrastructure. The outcomes of this initial impact pathway screening, across the construction, operation and maintenance (O&M), and decommissioning phases, are summarised in **Table 6.1**, reproduced from the ncMPA Screening Report (**Appendix 1.1: Bellrock Wind Farm Development Area Scoping Report (Volume IV)**) for completeness.

**Table 6.1: Summary of Initial Impact Pathway Screening for the Southern Trench Nature Conservation Marine Protected Area (ncMPA)**

Potential Impact	Construction	O&M	Decommissioning
UWN during unexploded ordnance (UXO) clearance (based on the worst case of high order clearance)	✓	x	x
UWN during geophysical surveys	x	x	x
UWN during piling <sup>1</sup>	✓	x	x
UWN from other activities (for example rock placement and cable laying)R	x	x	x

Potential Impact	Construction	O&M	Decommissioning
Presence of vessels and associated UWN	✓	✓	✓
UWN from operational wind turbines and floating turbine substructure moorings on the seabed	x	x	x
Collision risk with vessels	✓	✓	✓
Primary entanglement	x	x	x
Secondary entanglement	x	x	x
Changes in water quality	x	x	x
Changes to prey availability	x	x	x
Electromagnetic fields - direct effects	x	x	x
Notes: <sup>1</sup> For clarity, the impact pathway referred to in the ncMPA Screening Report ( <b>Appendix 1.1: Bellrock Wind Farm Development Area Scoping Report (Volume IV)</b> ) as “UWN during substructure installation” is referred to in this report as “UWN during piling”. This reflects refinement of the project description.			

## 6.3 Updated Impact Pathway Screening

19. Following completion of the project-specific UWN modelling (**Appendix 9.2: Underwater Noise Modelling Report (Volume IV)**), the impact pathways associated UWN have been refined.
20. For both UXO clearance and piling, the predicted maximum impact ranges for auditory injury (permanent threshold shift (PTS)) are substantially smaller than the 94 km separation distance between the Bellrock WFDA and the Southern Trench ncMPA. For UXO clearance, the worst-case high-order denotation impact range is 11 km for minke whale, while the low-order denotation impact range is just 230 m. For single-strike piling without mitigation, the predicted PTS impact range based on peak sound pressure level ( $SPL_{peak}$ ) is approximately 0.06 km, while the predicted impact range for PTS arising from cumulative sound exposure level ( $SEL_{cum}$ ), incorporating soft start and ramp-up procedures, is approximately 25 km. There is therefore no spatial overlap between modelled PTS impact ranges and the ncMPA boundary.
21. Accordingly, the auditory injury (PTS) component of the UWN pathway for UXO clearance and piling can be screened out from further assessment in relation to the Southern Trench ncMPA.
22. However, behavioural distance arising from UWN remains a plausible impact pathway and is assessed further in **Section 9.3**.

## 7 Main Assessment – Methodology

23. The assessment of effects on site conservation objectives will consider whether the Bellrock Wind Farm Infrastructure, risk hindering the achievement of the stated conservation objectives of the minke whale feature of the Southern Trench ncMPA.
24. The assessment will consider the nature, scale, spatial extent, timing, and duration of all activities associated with the Wind Farm Infrastructure that have been identified as giving rise to a plausible impact pathway to the ncMPA (**Section 6**).
25. The conservation objectives for ncMPA features define the condition required for the features and the site to be maintained or restored to favourable conservation status. In broad terms, these objectives require that:
- Where a feature is in favourable condition, that condition is maintained; or
  - Where a feature is not in favourable condition, the feature is allowed to recover to a favourable condition and to be maintained thereafter.
26. The assessment will therefore consider whether activities associated with the Bellrock Wind Farm Infrastructure could result in:
- Deterioration in the condition of protected features;
  - Hindrance to the maintenance of favour condition of features; or
  - Obstruction of recovery to favourable condition where a feature is currently in an unfavourable condition.
27. In line with relevant guidance, temporary and reversible effects that do not affect the ability of the feature to recover naturally and do not compromise the long-term achievement of the conservation objectives will not, in isolation, be considered to hinder the achievement of the conservation objectives, provided the feature and supporting processes are sufficiently resilient.
28. Following consideration of the effects Bellrock Wind Farm Infrastructure alone, the assessment will also consider cumulative effects with other projects that have the potential to interact spatially and temporally with the Bellrock Wind Farm Infrastructure and affect the minke whale feature of the Southern Trench ncMPA.

## 8 Overview of the Bellrock Wind Farm Infrastructure

29. A detailed description of the Bellrock Wind Farm Infrastructure is provided in **Chapter 4: Project Description (Volume II)** of the Bellrock WFDA EIA Report and is not repeated in full here.

30. The information summarised below is provided to give context for the RIMPAA only.

### 8.1 Wind Farm Infrastructure

31. The Wind Farm Infrastructure comprises:

- Up to 132 wind turbine generators with floating substructures (FSS) (together termed as an 'floating offshore unit' (FOU));
- Station keeping systems for each FSS, including mooring lines, anchoring systems and ancillary elements;
- Scour protection for FSS anchoring points;
- Approximately 300 km of inter-array cables comprising static and dynamic sections of inter-array cables linking the individual FOUs to subsea cable hub(s) or to the offshore substation(s)<sup>1</sup>;
- Associated cable protection as required;
- Up to 18 subsea cable hubs; and
- Ancillary elements including buoys, other navigational markers and monitoring equipment.

32. For full detail on the Bellrock Wind Farm Infrastructure please refer to Section 4.4 of **Chapter 4: Project Description (Volume II)** of the Bellrock WFDA EIA Report.

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<sup>1</sup> Offshore substation(s) will be consented as part of the OfTDA and will be assessed as part of the Bellrock OfTDA EIA Report. The OfTDA is also considered within the Bellrock WFDA EIA's cumulative effects assessments.

## 8.2 Development Phases and Associated Vessel Activity

33. The Bellrock Wind Farm Infrastructure will be delivered over three development phases:
- Construction (for the purpose of this RIMPAA, including site preparation works);
  - O&M; and
  - Decommissioning.
34. Each development phase will require vessel operations to support offshore activities. The nature, frequency, and duration of vessel activity will vary between phases.
35. Vessel operations will primarily be undertaken within the Bellrock WFDA; however, vessels will transit through wider Scottish inshore and offshore waters when travelling to and from the Bellrock WFDA. Details of vessel types, numbers, activity levels, and indicative construction (including integration and assembly ports) and O&M ports are provided in **Chapter 4: Project Description (Volume II)** of the Bellrock WFDA EIA Report.

## 8.3 Realistic Worst-case Scenario

36. The final design of the Bellrock Wind Farm Infrastructure will be confirmed during detailed engineering studies post-consent. To undertake robust and precautionary assessment the realistic worst-case scenarios are derived from the Project Design Envelope to ensure that all other design scenarios would have equal or less impact. **Table 8.1** presents the worst-case scenario for the impact pathways that have been screened in this RIMPAA, as outlined in **Section 6**.

**Table 8.1: Worst-case Scenario for the Screened In Impact Pathways**

Impact Pathway	Development Phase	Worst-case Scenario
UWN during UXO clearance	Construction	<p>A realistic worst-case is UXO with a net explosive quantity (NEQ) of 750 kilograms (kg) (<b>Appendix 9.3: Unexploded Ordnance Assessment (Volume IV)</b>). The following has been considered:</p> <ul style="list-style-type: none"> <li>▪ Types and sizes of UXO: Various possible types and sizes of UXO, ranging from 0.25 kg to 750 kg;</li> <li>▪ UWN modelling and assessments based high-order detonation of UXO with NEQ of 750 kg (including donor charge);</li> <li>▪ Low-order clearance would be the default method for UXO that require clearance;</li> <li>▪ UWN modelling and assessments include low-order deflagration with shaped charge of 0.25 kg NEQ; and</li> <li>▪ As a worst-case, assessments are based on contingency high-order detonation without mitigation.</li> </ul>
UWN during piling	Construction	<ul style="list-style-type: none"> <li>▪ The construction phase is expected to take place between 2031 to 2037 (total construction duration of up to seven years, in addition to one year of site preparation works<sup>1</sup> commencing 2030). No piling works will be undertaken during site preparation works;</li> <li>▪ Number of FOU driven piles for maximum 132 FOU = 1,188 (9 anchors per FOU x 132);</li> <li>▪ Maximum hammer energy = 3,000 kilojoules;</li> <li>▪ Maximum FOU driven pile diameter = 6 m;</li> <li>▪ Duration of anchor installation for single FOU = 3 days (3 FOU driven piles per 24 hours, for up to 9 anchors);</li> <li>▪ Maximum total active piling time per FOU (including soft-start and ramp-up) = 2.99 hours per FOU driven pile, up to 8.97 hours piling per day; and</li> <li>▪ Total piling time for 132 FOU = 3,552.12 hours.</li> </ul>
Presence of vessels and associated UWN	Construction	<ul style="list-style-type: none"> <li>▪ A range of vessel types will be required across site preparation and construction, please see <b>Chapter 4: Project Description (Volume II)</b> for further details.</li> <li>▪ Site Preparation and Construction:                         <ul style="list-style-type: none"> <li>– Maximum number of round trips for all vessels = 1,615; and</li> <li>– Maximum number of vessels at the Bellrock WFDA at any one time = 34.</li> </ul> </li> </ul>

Impact Pathway	Development Phase	Worst-case Scenario
	O&M	<ul style="list-style-type: none"> <li>▪ A range of vessel types will be required throughout O&amp;M, please see <b>Chapter 4: Project Description (Volume II)</b> for further details; and</li> <li>▪ O&amp;M:               <ul style="list-style-type: none"> <li>- Maximum number of round trips for all vessels (per year) = 211; and</li> <li>- Maximum number of vessels at the Bellrock WFDA at any one time = 21.</li> </ul> </li> </ul>
	Decommissioning	<ul style="list-style-type: none"> <li>▪ The sequencing of decommissioning is likely to be the reverse of the construction sequence, with similar types and numbers of vessels and equipment expected to be involved. Therefore, the worst-case scenario is predicted to be of equal or less than the worst-case scenario presented for the construction phase above.</li> </ul>
Collision risk with vessels	Construction	<ul style="list-style-type: none"> <li>▪ The worst-case scenario for this impact pathway mirrors that presented for the impact pathway: Presence of vessels and associated UWN.</li> </ul>
	O&M	
	Decommissioning	

# 9 Southern Trench Nature Conservation Marine Protected Area

## 9.1 Conservation Objectives

37. The Southern Trench ncMPA (see **Figure A.1 (Appendix A)**) was designated to protect a range of features including burrowed mud, fronts, minke whale, Quaternary of Scotland, shelf deeps, and submarine mass movement. For the purposes of this assessment, only minke whale, a mobile species of marine fauna capable of moving freely within and beyond the boundary of the ncMPA, is considered as it is the feature potentially affected by the Bellrock Wind Farm Infrastructure (NatureScot, 2025).
38. The high-level conservation objectives for the Southern Trench ncMPA, as set out in the site-specific Conservation and Management Advice (NatureScot, 2025), are that protected features should:
- So far as already in favourable condition, remain in such condition; and
  - So far as not already in favourable condition, be brought into such condition, and remain in such condition.
39. For mobile species, favourable condition is defined as where:
- The species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the ncMPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds;
  - The extent and distribution of any supporting features upon which the species is dependent is conserved or, where relevant, recovered; and
  - The structure and function of any supporting feature, including any associated processes supporting the species within the ncMPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.
40. Any alteration attributable solely to natural processes is disregarded when determining favourable condition.
41. At the most recent site condition assessment (from 2019), the minke whale feature of the Southern Trench ncMPA was assessed as being in favourable condition (NatureScot, 2025).

42. The site-specific Conservation and Management Advice (NatureScot, 2025) provide feature specific conservation objectives and advice:
- Species is conserved:
    - Minke whale in the Southern Trench ncMPA are not at significant risk from injury or killing.
  - Continued access by the species to resources provided by the ncMPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds:
    - Conserve access to key resources (e.g. for feeding) provided by the ncMPA for various stages of the minke whale lifecycle; and
    - Conserve the distribution of minke whale within the site by avoiding significant disturbance.
  - Extent and distribution of any supporting feature and structure and function of any supporting feature, including any associated processes supporting the species:
    - Conserve the extent and distribution of any supporting feature upon which minke whale is dependent; and
    - Conserve the structure and function of supporting features, including processes to ensure minke whale are healthy and not deteriorating.

### 9.1.1 Relevance of Conservation Objectives to this Assessment

43. **Table 9.1** identifies the screened in impact pathways that are relevant to each of the minke whale conservation objectives, indicating whether there is a plausible mechanism by which the Bellrock Wind Farm Infrastructure could hinder the achievement of the conservation objectives.

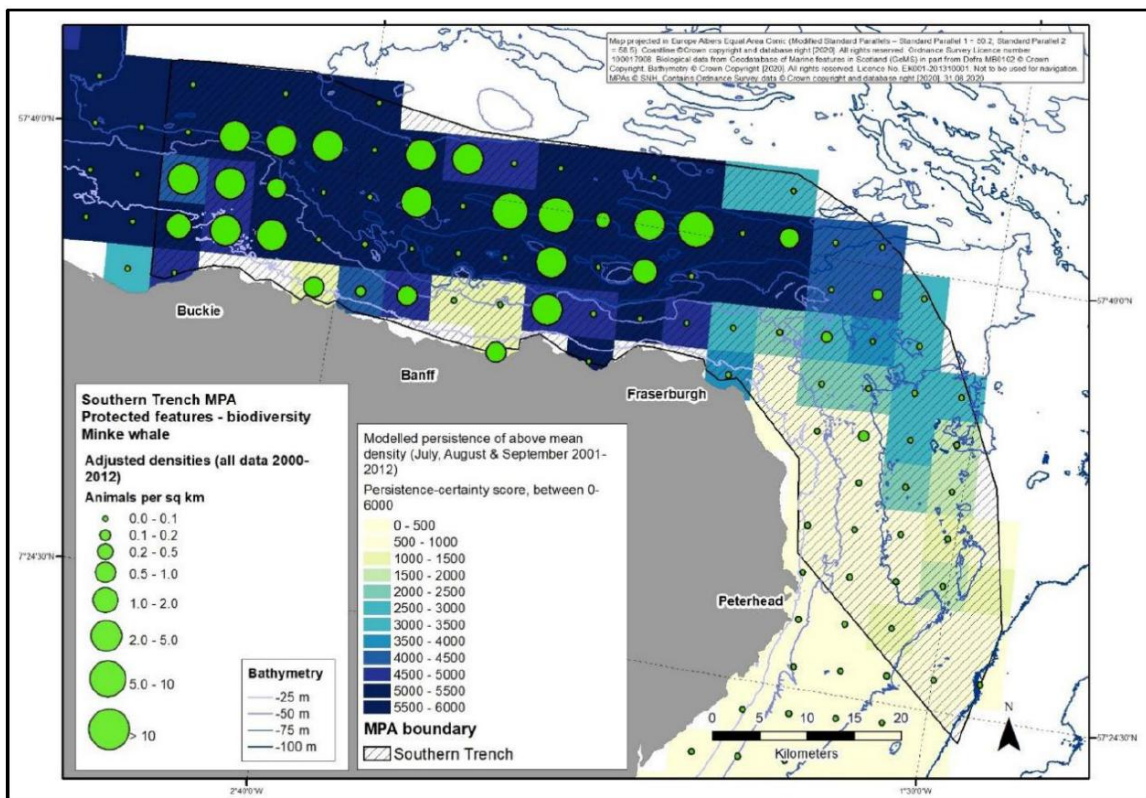
**Table 9.1: Relevance of Screened in Impact Pathways to the Minke Whale Conservation Objectives**

Minke Whale Conservation Objectives	Screened In Impact Pathways			
	UWN during UXO Clearance	UWN from Piling	Presence of Vessels and Associated UWN	Collision Risk
Minke whale in the Southern Trench ncMPA are not at significant risk from injury or killing.	x	x	x	✓
Conserve the access to resources (e.g. for feeding) provided by the ncMPA for various stages of the minke whale life cycle; and Conserve the distribution of minke whale within the site by avoiding significant disturbance.	✓	✓	✓	x
Conserve the extent and distribution of any supporting feature upon which minke whale is dependent; and Conserve the structure and function of supporting features, including processes to ensure minke whale are healthy and not deteriorating.	x	x	x	x

## 9.2 Baseline Condition

44. The conservation status of the minke whale feature of the Southern Trench ncMPA was last assessed in 2019, where it was classified as being in favourable condition (NatureScot, 2025). The ncMPA was designated primarily on the basis of habitat modelling indicating that it consistently supports above-average densities of minke whale, which is supported by effort-corrected sighting data (Paxton et al. 2014). Sightings are highest between June and October, although individuals are present throughout the year at lower densities (Robinson et al. 2009). Densities are generally lower towards the southern part of the ncMPA, which is the area closest to the Bellrock WFDA (please see **Plate 9.1**).

**Plate 9.1: Minke Whale Densities and Predicted Persistence of Above Mean Densities in the Southern Trench Nature Conservation Marine Protected Area (ncMPA)**



## 9.3 Main Assessment - Bellrock WFDA Alone

### 9.3.1 Construction

#### 9.3.1.1 Underwater Noise Disturbance

##### 9.3.1.1.1 UXO Clearance

45. Prior to construction (during the site preparation works), there is the potential for UXO clearance to be required. While any identified UXO will either be avoided or removed and disposed of in a designated place, there is the potential that underwater detonation could be required where it is necessary and unsafe to remove the UXO. UWN from the clearance of UXO could cause injury (PTS) or disturbance to minke whale.
46. In order to undertake any UXO clearance work (during the site preparation works or during the construction phase), a Marine Licence will be required under the Marine and Coastal Access Act 2009 (for activities more than 12 nautical miles offshore). In addition, the clearance of UXO by detonation may also require a European Protected Species Licence under the Conservation of Offshore Marine Habitats and Species Regulations 2017. If UXO clearance is necessary, a separate Marine Licence application (and, if necessary, a European Protected Species Licence application) will be submitted by the Applicant prior to construction supported by a detailed risk assessment based on the latest available information and an updated RIMPAA.
47. The number of possible UXO that may require to be cleared and the duration of UXO clearance operations are currently unknown. It is important to note therefore, that the assessments for UXO clearance here are preliminary, based on the realistic worst-case scenario and further assessment will be undertaken as part of any future Marine Licence application for UXO clearance, if UXO clearance is deemed necessary. Further information relating to the UXO assessment is provided in **Appendix 9.3: Unexploded Ordnance Assessment (Volume IV)**. The potential worst-case effects for minke whale from the Southern Trench ncMPA, utilising the assessments undertaken in the above appendix are summarised in **Table 9.2**.
48. For disturbance of minke whales from UXO clearance, quantitative assessment methods using the worst-case location of the north-west corner of the Bellrock WFDA are presented for:
  - 20 km effective deterrence range (EDR) assumed for high-order clearance of UXO (as recommended in Joint Nature Conservation Committee (JNCC), 2025a);
  - 5 km EDR assumed for low-order clearance (as recommended in JNCC, 2025a);
  - Temporary Threshold Shift (TTS) as a proxy for disturbance;
  - 11 km EDR assumed for acoustic deterrent device (ADD) activation before high-order clearance; and
  - 8 km EDR assumed for ADD activation before low-order clearance.

49. As discussed further in **Appendix 9.3: Unexploded Ordnance Assessment (Volume IV)**, the assessments for TTS/fleeing response have been used for assessing the potential disturbance ranges for UXO high-order clearance without noise mitigation, UXO low-order clearance, and ADDs. Therefore, the potential ranges and areas for TTS presented in **Table 9.2**, provides an indication of possible fleeing response.
50. Considering the Southern Trench ncMPA is situated 94 km away from the Bellrock WFDA at the closest point, the majority of the UXO assessment methods shown in **Table 9.2** do not overlap. With only the 750 kg + donor criteria using the TTS/fleeing response range overlapping with the Southern Trench ncMPA.
51. For high-order clearance, it is predicted that a maximum of 0% of the Southern Trench ncMPA shall be subject to disturbance assuming a 20 km EDR (this is likely an overestimate as the 20 km EDR was recommended for harbour porpoise (*Phocoena phocoena*) not minke whales and is therefore highly precautionary). Using TTS as a proxy for disturbance, the maximum impact range was predicted to be 110 km (**Table 9.2**), which predicts a maximum of 8.63% of the Southern Trench ncMPA shall be subject to disturbance. This area is also the southern portion of the ncMPA which is noted as having lower densities of minke whale compared to the north/north-west portion of the ncMPA (see **Plate 9.1**).
52. For low-order clearance it is predicted that there will be no overlap of the ncMPA area to disturbance assuming a 5 km EDR. Using TTS as a proxy for disturbance, the maximum impact range was also predicted to be 3.2 km which does not overlap (**Table 9.2**).
53. It is noted in the JNCC (2020) guidance that, although UXO detonation is considered a loud UWN source, “*a one-off explosion would probably only elicit a startle response and would not cause widespread and prolonged displacement*”. Whilst detonations will be undertaken as part of a campaign and, therefore, there may result in multiple detonations over several days (JNCC, 2025b), each detonation would result in very limited disturbance that would not cause long-term decline in the use of the ncMPA or a sustained change in distribution of minke whale within the ncMPA.

**Table 9.2: Maximum Number of Minke Whale Potentially at Risk of Disturbance During High and Low-order Unexploded Ordnance Clearance Without Noise Mitigation, and Acoustic Deterrent Device**

Criteria	Assessment Method	Effects within the Southern Trench ncMPA	
		Overlap (square kilometres (km <sup>2</sup> ))	% ncMPA Area
750 kg + donor	20 km EDR	0	0%
	110 km modelled TTS/fleeing response range (38,013 km <sup>2</sup> )	183.8	8.63%
0.25 kg NEQ	5 km EDR	0	0%
	3.2 km modelled TTS/fleeing response range (32.2 km <sup>2</sup> )	0	0%
<b>ADD Activation</b>			
Low-order clearance up to 12 minutes	8 km EDR	0	0%
	1.5 km (2.1 metres per second swim speed)	0	0%
High order (without noise mitigation) clearance up to 80 minutes (see <b>Appendix 9.3: UXO Assessment (Volume IV)</b> for further information)	11 km EDR	0	0%
	21 km (2.1 metres per second swim speed)	0	0%

### 9.3.1.1.2 Piling

54. Pile driving during the construction phase of the Bellrock WFDA has the potential to result in higher levels of UWN when compared to background levels and could result in potential behavioural effects on minke whale of the Southern Trench ncMPA. A detailed UWN modelling assessment was carried out to investigate the potential for such effects to occur, using the latest assessment criteria (see **Appendix 9.2: Underwater Noise Modelling Report (Volume IV)** and **Appendix 9.5: Underwater Noise Modelling Report (Volume IV)**).
55. The range of possible behavioural reactions that may occur as a result of exposure to UWN include orientation or attraction to a noise source, increased alertness, modification of characteristics of their own sounds, cessation of feeding or social interaction, alteration of movement/diving behaviour, temporary or permanent habitat abandonment and, in severe cases, panic, or stranding, sometimes resulting in injury or death (Southall et al. 2007).
56. There are currently no agreed thresholds or criteria for the behavioural response and disturbance of marine mammals, therefore it is not possible to conduct UWN modelling to predict impact ranges for minke whale.

57. In line with guidance from NatureScot, the Graham et al. (2017) harbour porpoise dose-response function has been used as a proxy for minke whale behavioural response to piling. Harbour porpoise are generally considered to be more sensitive to UWN than baleen whales; therefore, applying the harbour porpoise dose-response relationship to minke whale represents a precautionary approach, as there is uncertainty as to whether minke whales would respond behaviourally to the same received levels as harbour porpoise. NatureScot acknowledged that and therefore are welcoming of alternative thresholds being presented. As such, a range of disturbance thresholds have been presented in this assessment:
- Harbour porpoise dose-response function: It is important to note that recent research from Thompson et al. (2025), suggests that even dose-response modelling is likely to be overly conservative, based on new data collected from Moray West's installation of larger monopiles. However, comparisons of the predictions from the alternative Beatrice response functions provides evidence that distance from source is a better predictor of harbour porpoise response to piling. As above, there is no evidence that minke whales (a low frequency hearing group cetacean) will respond in the same way, at the same received levels as harbour porpoise (a very high frequency hearing group cetacean); and
  - 20 km EDR: this is advised as a disturbance range for harbour porpoise from pin piles (JNCC, 2025a). As detailed above, as harbour porpoise are generally considered to be more sensitive to UWN than baleen whales, there is no evidence that minke whales will respond at the same ranges as harbour porpoise.
58. As stated above, the dose-response function for harbour porpoise has been used as a precautionary proxy for behavioural disturbance in minke whale, enabling an assessment of the potential overlap with the Southern Trench ncMPA. Harbour porpoise are unlikely to exhibit a behavioural response to impulsive UWN below 140 dB re 1  $\mu\text{Pa}^2\text{s}$  (weighted  $\text{SEL}_{\text{ss}}$  and  $\text{SEL}_{\text{cum}}$ ) (Southall et al. 2019). Minke whale, as low-frequency cetaceans, are expected to have a higher behavioural response threshold (approximately 168 dB re 1  $\mu\text{Pa}^2\text{s}$  for impulsive noise).
59. Project-specific UWN modelling (**Appendix 9.2: Underwater Noise Modelling Report (Volume IV)**) demonstrates that the 140 dB re 1  $\mu\text{Pa}^2\text{s}$  contour does not overlap with the Southern Trench ncMPA. Although lower sound level contours (approximately 130 dB re 1  $\mu\text{Pa}^2\text{s}$  and below) do overlap with the ncMPA boundary, these levels are below the noise thresholds that can impact minke whale.
60. On this basis, there is no overlap between modelled sound levels exceeding the relevant behavioural response thresholds (Southall et al. 2019) and the Southern Trench ncMPA. Behavioural disturbance associated with impulsive UWN is therefore not predicted to occur within the ncMPA.
61. Assessment using the 20 km EDR for piling, recommended by JNCC (2025a) for porpoise, and the 10 km EDR as (recommended by Benhemma-Le Gall et al. (2024) for harbour porpoise response to XXL monopiles) showed that there would be no overlap with the Southern Trench ncMPA boundary (**Figure A.2 (Appendix A)** and **Table 9.3**).

**Table 9.3: Behavioural Disturbance from Piling**

Criteria	Impact Area (km <sup>2</sup> )	Overlap with the ncMPA	
		Overlap (km <sup>2</sup> )	% ncMPA Area
Dose-response – North-west	N/A	0	0%
Dose-response – East	N/A	0	0%
Dose-response – South-east	N/A	0	0%
20 km EDR – North-west (worst-case location)	1,256.6	0	0%

### 9.3.1.1.3 Presence of Vessels and Associated Underwater Noise

62. The Bellrock WFDA, where site preparation and construction activities will occur, is located approximately 94 km from the nearest point of the Southern Trench ncMPA. At this distance, there is no plausible pathway for impacts from vessels associated with site preparation or construction activities from the Bellrock WFDA.
63. A potential interaction pathway exists through vessels transiting to and from construction ports (assembly and integration ports) and the Bellrock WFDA. Depending on the ports ultimately used, some vessels may transit directly through the ncMPA (**Chapter 4: Project Description (Volume II)** of the Bellrock WFDA EIA Report provides an indicative list of construction ports). During construction (including site preparation), a maximum of 1,615 round trips are anticipated, with up to 34 vessels on site simultaneously.
64. Vessel transits are expected to occur at constant speeds along relatively consistent routes, with limited changes in speed and direction. Vessel activity will be aligned with the principles set out in the Scottish Marine Wildlife Watching Code (SMWWC) and the Guide to Best Practice for Watching Marine Wildlife (NatureScot, 2017a; NatureScot, 2017b), and all vessel movements will be managed under the VMNSP.
65. Evidence indicates that minke whale are sensitive to vessel presence, with energy expenditure increasing by approximately 28% during interactions and foraging behaviour being altered (e.g. shorter dives and changes in movement patterns) (Christiansen et al. 2013). However, this evidence primarily relates to whale-watching interactions, which involve closer and more variable vessel activity over longer temporal periods than the relatively short-term, linear and consistent (in terms of speed and direction) nature of interactions associated with vessel transits (Christiansen et al. 2013).
66. Noise levels reported for transiting large vessels indicate that physiological damage to auditory-sensitive marine mammals is unlikely (Malme et al. 1989; Richardson et al. 1995), and the potential for PTS caused by vessel noise is highly unlikely, with sound levels well below PTS thresholds (Southall et al. 2019; Trigg et al. 2020). In line with **Chapter 9: Marine Mammals (Volume II)** of the Bellrock WFDA EIA Report, a conservative 4 km disturbance buffer (with a disturbance area of 50.27 km<sup>2</sup>) has been applied for vessel noise. This buffer moves with the vessel as it transits

through the ncMPA, meaning that only a spatially constrained area is affected at any given time, rather than the entire area of the ncMPA that the vessel may transit through.

67. Therefore, based on the available evidence (Christiansen et al. 2013; Christiansen et al. 2015; Christiansen and Lusseau, 2015), the nature and extent of the potential impact, and the substantial distance between the Bellrock WFDA and the Southern Trench ncMPA, there is no potential for population level effects. While there is the potential for minke whale to experience disturbance (see Table 9.43 in **Chapter 9: Marine Mammals (Volume II)** whereby a maximum of three individuals are predicted to be effected) and display brief behavioural responses to vessels during transit, the speed and predictability of the transiting vessels indicate that the construction-phase vessel activity does not have the potential to hinder the relevant minke whale specific conservation objective of the Southern Trench ncMPA.

#### **9.3.1.1.4 Underwater Noise Disturbance Conclusion**

68. In summary, minke whale present within the Southern Trench ncMPA may be exposed to intermittent UWN and vessel activity during the construction phase. The potential disturbance pathways assessed comprised UXO clearance, piling, and vessel presence.
69. For piling, project-specific UWN modelling indicates that behavioural response thresholds are not exceeded within the Southern Trench ncMPA when considered in the context of minke whale hearing sensitivity. Accordingly, behavioural disturbance from piling is not anticipated to occur within the ncMPA.
70. For UXO clearance, overlap with the Southern Trench ncMPA is only predicted under the 750 kg + donor high-order detonation scenario. Under this scenario, the impact range (110 km) overlaps with approximately 8.63 % of the total ncMPA area. This overlap represents a limited proportion of the ncMPA and would arise from short-duration, discrete detonation events. Given the intermittent nature of the activity, the limited spatial extent of elevated sound levels within the ncMPA, and the highly mobile behaviour of minke whale, any disturbance response would be temporary and localised. It is not anticipated that such disturbance would result in displacement on a continuing or sustained basis.
71. Vessel-related disturbance within the Southern Trench ncMPA may occur due to round trips between construction ports and the Bellrock WFDA. However, vessel movements will be temporary, predictable and managed in accordance with embedded vessel management measures. In the context of existing regional vessel activity, the scale of additional disturbance is not considered significant.
72. There remains uncertainty regarding the precise behavioural response thresholds for minke whale to impulsive UWN. In the absence of species-specific dose-response data, precautionary proxy thresholds have been applied. Notwithstanding this uncertainty, the limited spatial overlap, temporary nature of exposure, and the absence of sustained or repeated disturbance at a scale affecting site-wide use indicate that the assessed impact pathways would not compromise minke whale continued access to key resources within the ncMPA.
73. It is therefore determined that none of the assessed impact pathways have the potential to hinder the achievement of the minke whale conservation objectives of the Southern Trench ncMPA.

Consequently, there is not potential for the Bellrock Wind Farm Infrastructure to hinder the achievement of the overarching conservation objectives of the ncMPA.

### 9.3.1.2 Collision Risk with Vessels

74. A potential collision risk pathway exists for vessels transiting between the construction ports and the Bellrock WFDA. Since the 1950s, with the advent of larger and faster-moving ships, there has been a steady increase in ship strikes of baleen whales. Mortality events involving minke whale are typically characterised by blunt trauma or propeller cuts and lacerations (Risch et al. 2019). A study assessing serious injury and mortality of large whales along the east coast of the United States of America between 1950 and 2009 found that 17 out of 396 (4.3 %) documented minke whale mortality events were attributed to ship strikes (Van der Hoop et al. 2012). Furthermore, based on United Kingdom Cetacean Strandings Investigation Programme data in the final contract report (Deaville et al. 2018) of the 64 necropsied minke whales, three were recorded with ship strike as the cause of death. This represents 4.7% of minke whale necropsies in that period. However, biases in reporting and under-recording suggest that the actual number of fatal and non-fatal ship strikes is likely higher (Peel et al. 2018).
75. For the Bellrock WFDA, vessel transits to and from construction ports are expected to occur over limited spatial and temporal scales. Vessel transits are expected to occur at relatively constant speeds along consistent transit corridors, with limited changes in speed and direction. Vessel activity will be aligned with the principles set out in the SMWWC and the Guide to Best Practice for Watching Marine Wildlife (NatureScot, 2017a; NatureScot, 2017b), and all vessel movements will be managed in accordance with the VMNSP. While there will be a degree of baseline vessel activity in the Southern Trench ncMPA, the nature of project vessel transits is such that any potential interactions with minke whales are brief, linear, and transient.
76. All vessel activity associated with the Bellrock WFDA will be managed in accordance with the VMNSP. The VMNSP will incorporate adherence to the SMWWC and the Guide to Best Practice for Watching Marine Wildlife, thereby embedding relevant marine wildlife protection measures within vessel operations.
77. Given the limited frequency and density of transiting vessels, consistent transit speed and direction, and implementation of the VMNSP, it is determined that construction phase vessel activity does not have the potential to hinder the relevant minke whale specific conservation objective of the Southern Trench ncMPA.

## 9.3.2 Operation and Maintenance

### 9.3.2.1 Presence of Vessels and Associated Underwater Noise and Collision Risk with Vessels

78. The Bellrock WFDA is located approximately 94 km from the nearest point of the Southern Trench ncMPA and therefore, as for the construction phase, no impact pathway exists between routine O&M activities at the Bellrock WFDA and the Southern Trench ncMPA.
79. A potential interaction pathway exists due to the potential for vessels to transit through the ncMPA on the way to and from the Bellrock WFDA from O&M ports. **Chapter 4: Project Description (Volume II)** of the Bellrock WFDA EIA Report provides an indicative list of O&M ports. Depending

on the ports ultimately used, some vessel transits may pass through the ncMPA. During the O&M phase, a maximum of 211 round trips per year is anticipated, with up to 21 vessels present at the Bellrock WFDA at any one time, over the 35-year O&M phase.

80. The O&M phase also includes the potential for major component repair, which may require FOU's to be towed to shore. Where required, towing operations would involve vessels towing up to two FOU's at low speeds, along predictable routes, with limited changes in speed or direction, consistent with the characteristics of routine vessel transits.
81. In all other respects, the nature, spatial extent, and magnitude of potential impacts associated with vessel noise, vessel presence, and collision risk during the O&M phase are consistent with those assessed for the construction phase (**Section 9.3.1**), including vessel transit characteristics, mitigation measures, and management through the VMNSP. Accordingly, it is determined that O&M phase vessel activity does not have the potential to hinder the achievement of the relevant minke whale conservation objectives of the Southern Trench ncMPA.

### 9.3.3 Decommissioning

#### 9.3.3.1 Presence of Vessels and Associated Underwater Noise and Collision Risk with Vessels

82. Decommissioning of the Bellrock Wind Farm Infrastructure will be subject to a separate Marine Licence application in advance of decommissioning commencing, at which stage the detailed scope, methodology and decommissioning programme will be defined. At this stage, a worst-case scenario has been adopted whereby decommissioning vessel activity is assumed to be comparable to that assessed for the construction phase.
83. As for construction, no impact pathway exists between decommissioning activities within the Bellrock WFDA and the Southern Trench ncMPA due to the separation distance of approximately 94 km. A potential impact pathway exists due to decommissioning vessels transiting between decommissioning ports and the Bellrock WFDA, with the potential for transiting vessels to pass through the ncMPA.
84. On this basis, and given that the nature, scale, and mitigation of vessel related impacts during decommissioning would be consistent with those assessed for construction (**Section 9.3.1**), the construction phase assessment is considered a suitable proxy for decommissioning. Accordingly, decommissioning phase vessel activity does not have the potential to hinder the achievement of the relevant minke whale conservation objectives of the Southern Trench ncMPA.

## 9.4 Main Assessment – Cumulative Effect Assessment

### 9.4.1 Impact Screening

85. The first step in the cumulative effect assessment (CEA) is the screening/identification of which impacts could have a cumulative effect with other plans and/or projects (described as 'impact

screening’). This information is set out in **Table 9.4**, together with a consideration of the confidence in the data that is available to inform a detailed assessment and the associated rationale.

**Table 9.4: Potential Cumulative Impacts (Impact Screening)**

Impact	Potential for Cumulative Impact	Data Confidence	Rationale
UWN during UXO clearance (behavioural disturbance only)	Yes	High	Disturbance due to UWN during UXO clearance refers to a temporary behavioural change caused by noise exposure and typically resolves within hours to days after the source ceases. These impacts generally extend over wider ranges and areas than those predicted for PTS.  Therefore, the potential for disturbance to minke whale from UWN during UXO clearance has been screened into the CEA.
UWN from piling (behavioural disturbance only)	No	High	Disturbance from UWN from piling was assessed as not reaching the Southern Trench ncMPA, as noted in <b>Section 9.3.1.1.2</b> and therefore there is not expected to be a pathway for cumulative effects within the ncMPA for this impact.  Therefore, the disturbance from UWN from piling has been screened out of the CEA.
Presence of vessels and associated UWN	Yes	Medium	Disturbance is a short-term behavioural change that is caused by noise exposure and typically resolves within hours to days after the exposure ends. Disturbance is likely to have greater impact ranges and areas than the PTS. The effects of disturbance in marine mammals are temporary.  Therefore, the potential for disturbance to minke whale from the presence of vessels and associated UWN has been screened into the CEA.
Collision risk with vessels	Yes	Medium	With robust mitigation measures in place, the risk of vessel collision involving minke whale is considered low, and the likelihood of the Bellrock Wind Farm infrastructure contributing to cumulative effects is minimised.  However, as following the approach in <b>Chapter 9: Marine Mammals (Volume II)</b> , the potential for vessel collision with, and disturbance to, minke whale have been included in the CEA.

## 9.4.2 Screening of Other Plans and Projects

86. The time period considered in the CEA for marine mammals (see **Chapter 9: Marine Mammals (Volume II)**) is 2030 to 2037 inclusive to account for projects constructing during the Bellrock Wind Farm Infrastructure site preparation and construction activities. The same timeframe has also been selected for the CEA for the Southern Trench ncMPA. For the purpose of the CEA, only projects which screened in and assessed the Southern Trench ncMPA were included into the screening list due to other projects are not deemed to be hindering the conservation objectives. Full screening of projects in relation to the Bellrock WFDA can be found in **Appendix 9.4: Mammals Cumulative Effects Assessment Screening (Volume IV)**. Due to the time required to undertake modelling, the CEA for marine mammals uses a six month cut-off for details on other projects and plans. The Applicant considers this an appropriate cut-off, ensuring that other recent projects are considered within the CEA whilst allowing sufficient time for a robust assessment of cumulative effects to be undertaken.
87. It has not been possible for the Applicant to seek consent for the Offshore Transmission Infrastructure and Onshore Transmission Infrastructure simultaneously with the Wind Farm Infrastructure.<sup>2</sup> However, this Bellrock WFDA EIA Report considers the relationship and interactions between the Bellrock Wind Farm Infrastructure and those other components of the Bellrock Project. The likely significant effects of the Bellrock Wind Farm Infrastructure together with the Bellrock Offshore Transmission Infrastructure and Onshore Transmission Infrastructure, so far as these can be ascertained at this stage, are assessed as part of this Bellrock WFDA EIA Report. (see **Chapter 5: Environmental Impact Assessment Methodology (Volume II)** of the Bellrock WFDA EIA Report).
88. Further assessment of the effects of the Bellrock Project as a whole will be included within the Bellrock OfTDA EIA Report and OnTDA EIA Report, which will include updated assessments of cumulative environmental impacts of the different components of the Bellrock Project. This approach is consistent with the relevant EIA Regulations, which make express provision for a multi-stage consent process, including in circumstances in which the likely significant effects of a project are not fully identifiable at the point at which an application for consent is determined. This multi-stage consent process allows for the potential effects of a project with different component parts to be assessed and considered as further information and detail becomes available.

## 9.4.3 Assessment of Cumulative Effects

89. Having established the potential cumulative impacts (**Section 9.4.1**), the following sections provide an assessment of the level of cumulative effect that may arise. These are detailed below per impact where the potential for cumulative effects has been identified (in line with **Table 9.4**).
90. During the assessment process for some projects, assessment information has evolved. It is considered that any refinements post submission in these assessments would not impact the

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<sup>2</sup> At the time the Scoping Request for the Bellrock WFDA was submitted (March 2024), the Bellrock Project's grid connection solution was a coordinated connection to an offshore substation. However, in April 2025 the National Energy System Operator (NESO) imposed a change to the Bellrock Project's grid connection, with this revised to a radial onshore connection at the proposed Hurlie substation in Aberdeenshire. As a result, the site selection processes for the Bellrock OfTDA and OnTDA remain ongoing, and it has been necessary for the Applicant to make a separate application for the Bellrock WFDA.

overall conclusions of this CEA. A review of newly available information confirms the robust approach to capture potential effects within the CEA which remains valid.

91. The following quantitative assessments presents the area of overlap between activity and the Southern Trench ncMPA to be affected or disturbed at a single point in time. With regard to disturbance, it is further noted that not all minke whale within these potential disturbance areas would be uniformly displaced. While some animals would flee there may be other disturbances in other areas of the Management Unit. Others might remain in the area of effect but additionally (or again) be disturbed by other noise sources.
92. Precise assessments of repeated disturbances over a period of time are currently not available. In lack thereof, a qualitative approach has been taken whereby the CEA of repeated disturbance events was investigated. It is also acknowledged that the noisy activities would not just occur simultaneously but rather intermittently over time and have the ability to both overlap and cause repeated disturbance events over the length of the Bellrock Wind Farm Infrastructure's phases.

#### 9.4.3.1 Underwater Noise during UXO Clearance

93. Given the vast extent of available habitat, the fact that minke whale are wide-ranging species and the low percentage of the population disturbed as a result of UXO clearance at respective projects, the likelihood of cumulative effects with projects located at large distances from the Bellrock WFDA is considered to be low. There were four projects identified with potential for cumulative effects that could overlap the Southern Trench ncMPA:
- Aspen OWF;
  - Bellrock OFTDA;
  - Caledonia OWF; and
  - Muir Mhòr OWF.
94. Each of the projects listed in **Table 9.5** have construction timelines which overlap that of the Bellrock Wind Farm Infrastructure. Due to recent advancements in the commercial availability of methods for UXO clearance, high-order detonation may be largely or completely avoided (Abad Oliva et al. 2024). Thus, it is reasonable to expect that UXO clearance at all projects will involve low-order deflagration methods.
95. The situation where UXO clearance and the noise disturbance overlap would occur within the ncMPA from multiple projects at the same time is unlikely but cannot be excluded. It is expected that the clearance of UXOs within the ncMPA would elicit short-duration behavioural responses only. Due to health and safety reasons, UXO clearance activities are anticipated to take place during pre-construction phases of relevant projects and during early construction phases (likely the first year of construction). Based on the CEA timeline (see **Appendix 9.4: Mammals Cumulative Effects Assessment Screening (Volume IV)**), UXO clearance would be anticipated to occur intermittently between 2030 – 2037.
96. Taking account of the nature, scale, and distribution of UXO clearances that is expected with the Bellrock Wind Farm Infrastructure in combination with other relevant projects, it is concluded that

cumulative effects from the UXO clearance, do not have the potential to hinder the achievement of the relevant minke whale specific conservation objectives of the Southern Trench ncMPA.

**Table 9.5: Disturbance from Unexploded Ordnance Clearance at the Bellrock Wind Farm Development Area and Other Projects**

Project	Disturbance Threshold	Area Overlap (km <sup>2</sup> )	Percentage of ncMPA
Bellrock WFDA and OfTDA	20 km EDR	0.00	0.00%
	Low order: 0.25 kg NEQ	0.00	0.00%
	High order: 750 kg (+ donor)	183.80	8.63%
Aspen	15 km EDR	0.00	0.00%
	Low order: 0.25 kg - SEL <sub>ss</sub>	0.00	0.00%
	High order: 907 kg (+ donor) - SEL <sub>ss</sub>	19.71	0.82%
Muir Mhòr	15 km EDR	0.00	0.00%
	Low order: 0.25 kg - SEL <sub>ss</sub>	0.17	0.01%
	High order: 750 kg (+ donor) – SEL <sub>ss</sub>	329.31	12.99%
Caledonia	Low order: 0.25 kg - SEL <sub>cum</sub>	0.17	<0.01%
<b>Total worst-case overlap if all projects were to clear high-order UXOs at the same time</b>		<b>532.82</b>	<b>22.44%</b>
<b>Total worst-case overlap if all projects were to clear low-order UXOs at the same time</b>		<b>0.34</b>	<b>0.02%</b>

#### 9.4.3.2 Presence of Vessels and Associated Underwater Noise and Collision Risk with Vessels

97. As a number of projects have not yet confirmed construction ports or O&M ports, and vessel routing strategies remain subject to further refinement, the list of projects considered in this cumulative assessment is indicative and represents those ScotWind and Innovation and Targeted Oil & Gas developments most likely to generate vessel movements within the wider regional area. These include Arven, Ayre, Aspen, Bellrock OfTDA, Berwick Bank, Bowdun, Broadshore Hub, Buchan, Cedar, Cenos, Caledonia, Havbredey, Morven, Muir Mhor, Ossian, Stoura, Stromar, and West of Orkney.
98. The Southern Trench ncMPA is located within the Moray Firth and wider east coast region, which is characterised by high baseline levels of vessel activity associated with established commercial ports, harbours, and anchorages, including ports supporting commercial shipping, commercial fishing, offshore renewables, and marine construction operations (European Marine Observation and Data Network, 2025). The area also contains well established vessel transit routes, some of which overlap with the Southern Trench ncMPA. As such, minke whale within the Southern Trench

ncMPA are already exposed to regular vessel presence and associated UWN under baseline conditions.

99. In the context of the screened in impact pathways, the projects of greatest relevance are ScotWind offshore wind developments located along the east coast of Scotland, which may be constructed and operated from ports within the Moray Firth and wider region. Vessels associated with these developments therefore have the potential to transit through the Southern Trench ncMPA, giving rise to cumulative vessel presence, associated UWN, and collision risk.
100. In addition, some offshore wind projects have offshore export cable corridors that pass through the Southern Trench ncMPA. Construction, O&M and decommissioning activities associated with these corridors may result in vessel activity occurring within the ncMPA at higher local densities and for longer durations than simple vessel transits, with vessels moving slowly or operating in a largely stationary manner. However, such activities are spatially constrained, temporally limited, and focused on specific locations within the ncMPA rather than occurring across the ncMPA as a whole.
101. Vessel activity associated with offshore wind developments is routinely undertaken in accordance with recognised best practice, including the SMWWC and the Guide to Best Practice for Watching Marine Wildlife, and is managed through project-specific VMNSPs (or similar) to coordinate movements and mitigate interactions with marine mammals.
102. Taking account of the nature, scale, and distribution of vessel activity associated with the Bellrock Wind Farm Infrastructure in combination with other relevant plans and projects, and the absence of any mechanism for sustained or widespread disturbance or collision risk across the ncMPA, it is concluded that cumulative effects from the presence of vessels and associated UWN, and collision risk, do not have the potential to hinder the achievement of the relevant minke whale specific conservation objectives of the Southern Trench ncMPA.

## 10 Conclusions

103. This assessment has been undertaken in accordance with the legislative requirements for ncMPAs. The Southern Trench ncMPA and its protected feature, minke whale, were screened in for assessment. No other ncMPAs or features required further assessment (**Section 6**).
104. An updated screening evaluation, informed by project-specific UWN modelling, confirmed that the potential for auditory injury (PTS) arising from UXO clearance and piling could be screened out (**Section 6.3**), as there is no spatial overlap between the maximum modelled PTS impact ranges and the Southern Trench ncMPA.
105. The following impact pathways were therefore assessed:
- UWN during UXO clearance (behavioural disturbance only);
  - UWN during piling (behavioural disturbance only);
  - Presence of vessels and associated UWN; and
  - Collision risk with vessels.
106. Taking account of the separation distance between the Bellrock WFDA and the Southern Trench ncMPA (approximately 94 km), project-specific modelling demonstrates that UWN from piling does not give rise to a disturbance impact pathway within the ncMPA.
107. For UXO clearance, overlap between the modelled impact range associated with high-order detonation and the Southern Trench ncMPA was identified. However, having regard to the short-duration, intermittent nature of detonation events, the limited spatial extent of elevated sound levels within the ncMPA, and the highly mobile nature of minke whale, any behavioural response would be temporary and localised. The assessment concluded that such disturbance would not be of a scale, duration, or frequency capable of hindering the achievement of the conservation objectives of the minke whale and ncMPA.
108. With respect to vessel-related impact pathways, consideration of vessel numbers, transit characteristics, embedded mitigation, and regional baseline conditions indicates that disturbance and collision risk would not be at a scale capable of hindering the achievement of the conservation objectives of the minke whale and ncMPA.
109. As such, none of the impact pathways assessed, either alone or cumulative, are considered to have the potential to hinder the achievement of the minke whale conservation objectives of the Southern Trench ncMPA. It is therefore concluded that the Bellrock Wind Farm Infrastructure would not hinder the achievement of the overarching conservation objectives of the ncMPA and that, for the purposes of Section 83(4) of the Marine (Scotland) Act 2010, the assessment demonstrates that the Scottish Ministers can be satisfied that there is **no significant** risk of the Bellrock Wind Farm Infrastructure hindering the stated conservative objectives.

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# Appendix A – Figures

Figure A.1: Location of the Bellrock Wind Farm Development Area in Relation to the Southern Trench Nature Conservation Marine Protected Area

Figure A.2: Disturbance Contours Showing SEL<sub>ss</sub> between 140 and 185 dB re 1  $\mu\text{Pa}^2\text{s}$  in 5 dB Steps, and 20 km Effective deterrence range for Piling at the NW Modelling Location and their Overlap with the Southern Trench Nature Conservation Marine Protected Area

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550000

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650000

700000

Moray Firth



6400000

6400000

6350000

6350000

6300000

6300000

Southern Trench ncMPA

199

Elgin

Buckie

Fraserburgh

Peterhead

Aberdeen

River Dee

River Dee

Stonehaven

Brechin

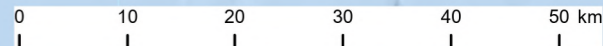
Montrose

Blairgowrie

Arbroath

93.7 km

Devil's Hole



Legend:

- Bellrock Wind Farm Development Area
- Southern Trench Nature Conservation Marine Protected Area

1	31/03/2026	Final	DL	ES	BMcG
REV	DATE	STATUS	DRW	CHK	APR
Coordinate System: WGS 1984 UTM Zone 30N					
Source:					
Sources: Esri, TomTom, Garmin, GEBCO, National Geographic, NOAA, and the GIS User Community, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, OceanWise, Esri, Garmin, NaturalVue, © Haskoning UK Ltd, 2026.					
Scale @ A3					
1:700,000					

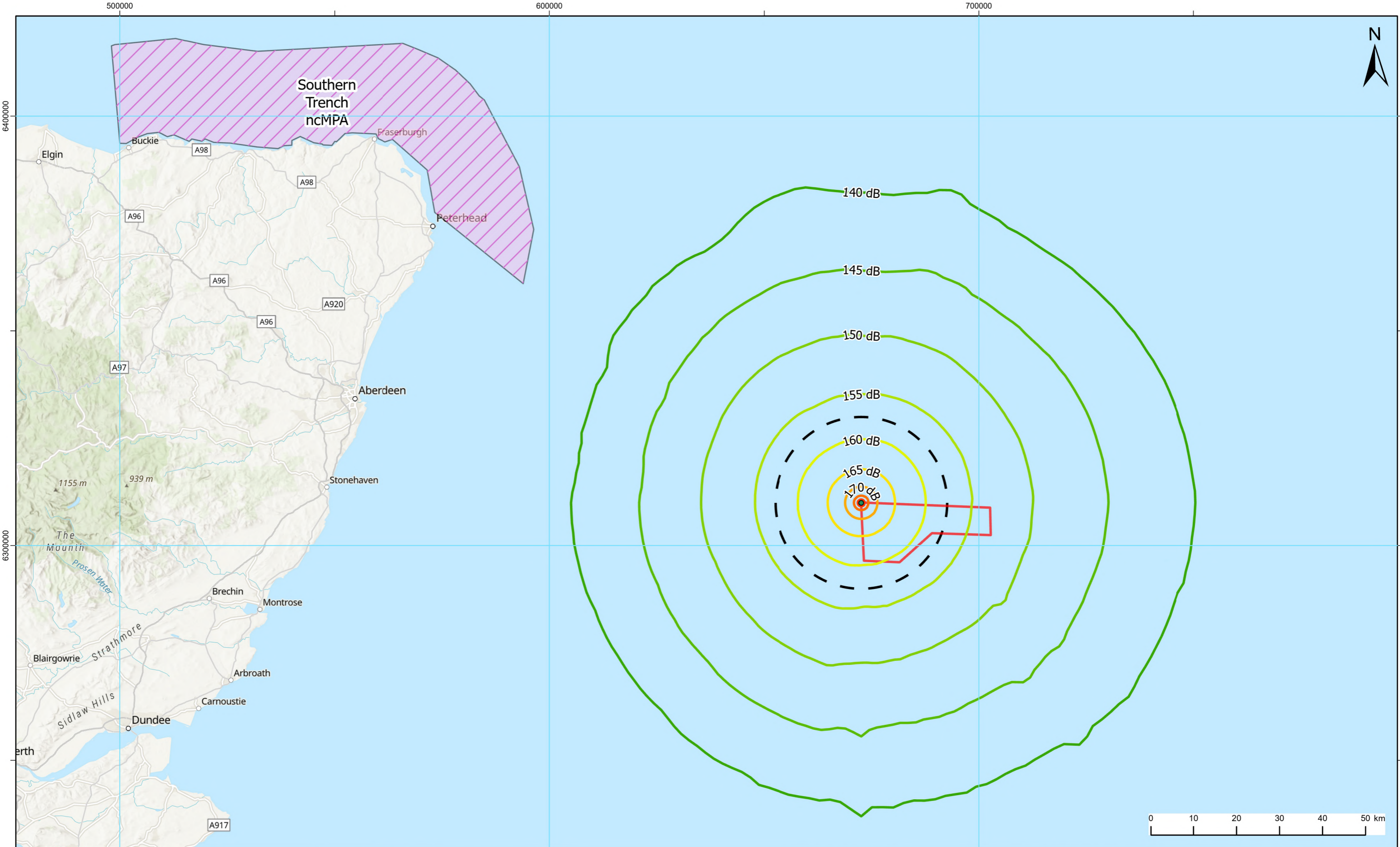
Figure Title: **Bellrock Wind Farm Development Area in Relation to the Southern Trench Nature Conservation Marine Protected Area**

Project: Bellrock Wind Farm Development Area (WFDA)

Report: Bellrock WFDA ncMPA Assessment

Drawing No.: RHDV\_BEL\_CST\_REP\_0003\_142

**Figure A.1**



**Legend:**

Bellrock Wind Farm Development Area	155
Southern Trench Nature Conservation Marine Protected Area	160
20 km Effective Deterrent Range	165
<b>SELs (dB re 1 <math>\mu</math>Pa<sub>2s</sub>)</b>	170
140	175
145	180
150	185

1	31/03/2026	Final	DL	ES	BMcG
REV	DATE	STATUS	DRW	CHK	APR
Coordinate System: WGS 1984 UTM Zone 30N			Scale @ A3		
Source: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS, © Haskoning UK Ltd, 2026.			1:800,000		

Figure Title: <b>Disturbance Contours Showing SELs and 20 km Effective Deterrent Range for Piling at the North-west Modelling Location</b>	
Project: Bellrock Wind Farm Development Area (WFDA)	Report: Bellrock WFDA ncMPA Assessment
Drawing No.: RHDV_BEL_CST_REP_0003_143	<b>Figure A.2</b>

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