



Bellrock Offshore Wind Farm

Wind Farm Development Area

Environmental Impact Assessment Report - Volume II

Chapter 13: Aviation and Radar

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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 Wind Farm Development Area
Bellrock Offshore Wind Farm (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.
Controlled Airspace	Defined airspace within which pilots must follow Air Traffic Control instructions. In the UK, Classes A, C, D and E are areas of controlled airspace.
Flight Information Region	Airspace managed by a controlling authority with responsibility for ensuring air traffic services are provided to aircraft flying within it.
Flight Level	An aircraft altitude expressed in hundreds of feet at a standard sea level pressure datum of 1,013.25 hectopascals.
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.
Instrument Flight Rules	Rules which allow properly equipped aircraft to be flown under Instrument Meteorological Conditions.
Instrument Meteorological Conditions	Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for Visual Meteorological Conditions.
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.
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).

Term	Definition
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).
Primary Surveillance Radar	A radar system that measures the bearing and distance of targets using the detected reflections of radio signals.
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.
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.
Secondary Surveillance Radar	A radar system that transmits interrogation pulses and receives transmitted responses from suitably equipped targets.
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.
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.
Uncontrolled Airspace	Defined airspace in which Air Traffic Control does not exercise exclusive authority but may provide basic information services to aircraft in radio contact. In the United Kingdom, Class G is uncontrolled airspace.
Visual Flight Rules	Rules that govern the operation of aircraft in Visual Meteorological Conditions, conditions in which flight solely by visual reference is possible.
Visual Meteorological Conditions	Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.
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).

Glossary of Abbreviations

Term	Definition
AARA	Air-to-Air Refuelling Area
AD	Air defence
AD&OW	Air Defence and Offshore Wind
AIP	Aeronautical Information Publication
ANO	Air Navigation Order
ATC	Air traffic control
ATS	Air traffic service
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CEA	Cumulative Effects Assessment
CES	Crown Estate Scotland
CMS	Construction Method Statement
DESNZ	Department for Energy Security and Net Zero
DGC	Defence Geographic Centre
DIO	Defence Infrastructure Organisation
DP	Decommissioning Programme
DSLPL	Development Specification and Layout Plan
EIA	Environmental Impact Assessment
ERCoP	Emergency Response and Cooperation Plan
FIR	Flight information region
FL	Flight level
FOU	Floating offshore unit
FSS	Floating substructure
HAT	Highest astronomical tide
HCA	Helideck Certification Agency
HLV	Heavy lift vessel
HMRI	Helicopter main routing indicator

Term	Definition
IAC	Inter-array cables
IA-CaP	Inter-array Cable Plan
IFP	Instrument flight procedure
IFR	Instrument flight rules
IMC	Instrument meteorological conditions
LMP	Lighting and Marking Plan
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate – Licensing Operations Team
MGN	Marine Guidance Note
MOD	Ministry of Defence
MSL	Mean Sea Level
NSP	National Policy Statement
NSP	Navigational Safety Plan
O&M	Operation and maintenance
Ofcom	Office of Communications
OFTDA	Offshore Transmission Development Area
OMP	Operation and Maintenance Plan
OnTDA	Onshore Transmission Development Area
OREI	Offshore renewable energy installation
OSA	Offshore safety area
OWF	Offshore wind farm
PEXA	Practice and exercise area
PSR	Primary surveillance radar
RAF	Royal Air Force
RLoS	Radar line of sight
RRH	Remote radar head
S&IP	Strategy and Implementation Plan
SAR	Search and rescue

Term	Definition
SKS	Station keeping system
SSR	Secondary surveillance radar
TMZ	Transponder mandatory zone
TOPA	Technical and Operational Assessment
VFR	Visual flight rules
VMC	Visual meteorological conditions
VMP	Vessel Management Plan
WFDA	Wind Farm Development Area
WTG	Wind turbine generator

13 Aviation and Radar

13.1 Introduction

2. This Chapter of the Bellrock Wind Farm Development Area (WFDA) Environmental Impact Assessment (EIA) Report presents an assessment of potential effects on aviation and radar from the construction, operation and maintenance (O&M) and decommissioning phases of the Bellrock Wind Farm Infrastructure.
3. 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)**.
4. A full description of the Bellrock WFDA is provided in **Chapter 4: Project Description (Volume II)**. As noted in **Chapter 4 (Table 4.5)**, the maximum design envelope for the WTG includes a maximum blade tip height of 271 m (WTG Type 1) or 335 m (WTG Type 2) above sea surface. As the floating offshore unit (FOU) will rise and fall with the tide¹, the maximum blade tip height, for the purpose of considering aviation and radar impacts, will therefore be 271 m/335 m above Highest Astronomical Tide (HAT). Within the Bellrock WFDA, the height difference between MSL and HAT is approximately 1.3 m. For the purpose of radar line of sight (RLoS) modelling, which adopts a datum of above MSL, it is therefore necessary to correct the maximum blade tip height from 271 m/335 m above HAT to 273 m/337 m above MSL (i.e. 271 m plus 1.2 m rounded to 273 m) to take account of the height difference between MSL and HAT. Therefore, throughout this Chapter, the effective maximum blade tip height is referred to as 273 m (WTG Type 1) or 337 m (WTG Type 2) above MSL.
5. 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 aviation and radar receptors.
6. This Chapter should be read in conjunction with the following Chapters of the Bellrock WFDA EIA Report:
 - **Chapter 12: Shipping and Navigation (Volume II)**;
 - **Chapter 16: Socioeconomics, Tourism and Recreation (Volume II)**; and
 - **Chapter 19: Major Accidents and Disasters (Volume II)**.

¹ Apart from a tension leg platform design, which will not rise and fall with the tide.

7. The aviation and radar assessment is likely to have key inter-relationships with the above chapters, which will be considered appropriately throughout this Bellrock WFDA EIA Report.
8. Additional information to support the aviation and radar assessment includes:
 - **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV).**
9. This Chapter was prepared by Cyrrus Limited.

13.2 Legislation, Policy and Guidance

10. **Table 13.1** describes the legislation, policy and guidance which have been considered in the preparation of this Chapter. The overarching policy and legislation relevant to the aviation and radar is described in **Chapter 2: Policy and Legislative Context (Volume II)**.
11. Legislation referred to in this EIA Report includes subsequent amendments in force as at the date of writing this EIA Report.

Table 13.1: Summary of Relevant Legislation, Policy and Guidance for Aviation and Radar

Relevant Legislation, Policy and Guidance	Relevance to the Assessment
Legislation	
Air Navigation Order (ANO) 2016/765 (CAA, 2022)	<p>The ANO implements the UK's obligations under the Chicago Convention on International Civil Aviation and regulates aspects of aviation safety. It provides regulatory and enforcement powers for the CAA needed in respect of retained safety legislation.</p> <p>ANO Article 222 details the requirements for the lighting of en-route obstacles that are 150 m or more above ground level.</p> <p>ANO Article 223 modifies the requirements of Article 222 with respect to WTGs in UK territorial waters of 60 m or more above the level of the sea at the HAT.</p> <p>Article 225A details the requirements for notifying the CAA of any planned works to erect new en-route obstacles that are 100 m or more above sea level.</p> <p>Lighting requirements will inform the embedded mitigation measures outlined in Table 13.10.</p>
Policy	
Civil Aviation Publication (CAP) 764: Policy and Guidelines on Wind Turbines (CAA, 2025)	<p>CAP 764 details the CAA policy and guidelines associated with WTG impacts on aviation that aviation stakeholders and wind energy developers need to consider when assessing a development's viability. CAP 764 guidance has informed the aviation and radar study area (Section 13.5) and assessment of likely significant effects (Section 13.8). CAP 764 also recommends that where a WTG development may impact an MOD surveillance system, early engagement with the MOD is recommended. (Section 13.3).</p>

Relevant Legislation, Policy and Guidance	Relevance to the Assessment
	<p>The effects of the construction, O&M and decommissioning phases of the Bellrock Wind Farm Infrastructure have been assessed in Section 13.8.</p> <p>Embedded mitigation measures are highlighted in Section 13.7 and Table 13.10.</p>
<p>National Planning Framework 4 (Scottish Government, 2023a)</p>	<p>The Energy Policy (Policy 11) states that project design and mitigation will demonstrate how impacts on aviation and defence interests are addressed.</p> <p>The effects of the construction, O&M and decommissioning phases of the Bellrock Wind Farm Infrastructure have been assessed in Section 13.8.</p>
<p>Guidance</p>	
<p>CAP 032: UK Aeronautical Information Publication (AIP) (CAA, 2025)</p>	<p>The UK AIP is the main resource for information on facilities, services and flight procedures at all licensed UK airports, as well as UK airspace rules, regulations and restrictions, en-route procedures, charts and other air navigation information.</p> <p>Used to identify airspace and potential aviation receptors impacted by the Bellrock Wind Farm Infrastructure. This guidance is considered throughout this EIA Chapter.</p>
<p>CAP 168: Licensing of Aerodromes (CAA, 2022)</p>	<p>CAP 168 sets out the standards required at UK licensed aerodromes relating to management systems, operational procedures, physical characteristics, assessment and treatment of obstacles and visual aids.</p> <p>This guidance informed the study area and baseline in Section 13.5.</p>
<p>CAP 670: Air Traffic Services Safety Requirements (CAA, 2019)</p>	<p>CAP 670 sets out the safety regulatory framework and highlights the requirements to be met by providers of civil ATS and other services in the UK in order to ensure that those services are safe for use by aircraft.</p> <p>This guidance informed the study area and baseline in Section 13.5.</p>
<p>CAP 1616: Airspace Change Process (CAA, 2024)</p>	<p>CAP 1616 explains the airspace change process for making a permanent change to the notified airspace design.</p>
<p>CAP 437: Standards for Offshore Helicopter Landing Areas (CAA, 2023)</p>	<p>CAP 437 provides the criteria applied by the CAA in assessing offshore helicopter landing areas for worldwide use by helicopters registered in the UK and includes winching area 'best practice' design criteria for WTGs.</p>
<p>CAP 774: UK Flight Information Services (CAA, 2021)</p>	<p>CAP 774 details the ATS provided in uncontrolled airspace within the UK flight information region (FIR).</p>
<p>UK Military AIP (MOD, 2025)</p>	<p>The UK Military AIP is the main resource for information and flight procedures at military aerodromes.</p> <p>This guidance is considered throughout this EIA Chapter.</p>
<p>MOD Obstruction Lighting Guidance (MOD, 2020)</p>	<p>Lighting requirements will inform the embedded mitigation measures highlighted in Table 13.10.</p>

Relevant Legislation, Policy and Guidance	Relevance to the Assessment
Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021)	MGN 654 highlights issues to consider when assessing navigational safety and emergency response, caused by OREI developments. MCA requirements considered within embedded mitigation measures highlighted in Table 13.10 .
MCA document OREI: Requirements, Guidance and Operational Considerations for SAR and Emergency Response (MGN 654 Annex 5) (MCA, 2024)	MCA requirements considered within embedded mitigation measures highlighted in Table 13.10 .

13.3 Consultation

12. Aviation stakeholders potentially affected include the Civil Aviation Authority (CAA), NATS, the Ministry of Defence (MOD), Aberdeen International Airport, and offshore helicopter operators such as Bristow Group, who currently deliver the UK search and rescue (SAR) contract on behalf of His Majesty's Coastguard.
13. Consultation undertaken to date for the Bellrock Wind Farm Infrastructure relevant to aviation and radar 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 13.2** below.

Table 13.2: Consultation Relevant to Aviation and Radar

Consultee	Date/Document	Comment	How/Where Comment is Addressed
MD-LOT	Bellrock WFDA Scoping Opinion (2024).	<i>'The Scottish Ministers are broadly content with the study area as defined in Section 12.4.1 of the Bellrock WFDA Scoping Report and that the baseline data gathered for the assessment is appropriate.'</i>	Potential impacts 'scoped in' during the scoping stage have been assessed further in Section 13.8 and Section 13.9 . The study area and baseline are described in Section 13.5.1 and Section 13.6 , respectively.
MD-LOT	Bellrock WFDA Scoping Opinion (2024).	<i>'In Table 12.3 of the Bellrock WFDA Scoping Report the Developer summarises the potential impacts to Aviation, Military and Communications during the different phases of the Proposed Development. The Scottish Ministers largely agree with the impacts scoped in to and out of the EIA Report.'</i>	Potential impacts 'scoped in' during the scoping stage have been assessed further in Section 13.8 and Section 13.9 . Impacts scoped in and out are highlighted in Table 13.8 .
MD-LOT	Bellrock WFDA Scoping Opinion (2024).	<i>'The Scottish Ministers highlight the representation from NATS which predicts that the Proposed Development is likely to generate false primary plots and also a reduction in the probability of Perwinnes RADAR to detect real aircraft. NATS has also advised that the Proposed Development will likely have unacceptable impacts to Prestwick Air Traffic Control ("ATC"), Military ATC and Aberdeen ATC. This view is supported in the representation from Aberdeen Airport with regard to aerodrome safety in the safeguarding area for Aberdeen in relation to construction and maintenance activities associated with the Proposed Development. The Scottish Ministers therefore recommend the Developer engage further with NATS on these points and advise that these impacts must be assessed, and appropriate mitigation proposed, in the EIA Report.'</i>	Impact to NATS Perwinnes is assessed in Section 13.8 and Section 13.9 . Subsequent to the Scoping Opinion, the Applicant reduced the maximum blade tip height from 400 m above mean sea level (MSL) to 337 m above MSL (Chapter 3: Site Selection and Consideration of Alternatives (Volume II)). Subsequent to this design change, the Applicant has engaged NATS on the revised WTG parameters and NATS advise that their analysis shows that WTGs with a maximum blade tip height of 337 m above MSL, would be below radar line of sight (RLoS) and "even when we [NATS] apply ducting corrections the detection probability would low enough that it would not draw a NATS objection".

Consultee	Date/Document	Comment	How/Where Comment is Addressed
MD-LOT	Bellrock WFDA Scoping Opinion (2024).	<i>'The Scottish Ministers highlight the representation from MOD DIO, which acknowledges the potential for the proposed development to impact the operation and capability of the Air Defence Radars at Remote Radio [sic] Head Buchan. The Scottish Ministers, in line with MOD DIO advice, therefore, advise that these impacts must be assessed, and appropriate mitigation proposed, in the EIA Report.'</i>	Impact to Remote Radar Head (RRH) Buchan is assessed in Section 13.8 . Subsequent to the Scoping Opinion, the Applicant reduced the maximum blade tip height from 400 m above MSL to 337 m above MSL. This design change significantly reduces the footprint of the Bellrock WFDA that is in RLoS of RRH Buchan. See Section 13.8.2.3.4 for further information on secondary mitigation measures proposed. The Applicant will continue to engage with DIO on this matter.
Aberdeen International Airport	Representation on the Bellrock WFDA Scoping Opinion (2024).	<i>'The Bellrock WFDA scoping report submitted has been examined from an aerodrome safeguarding perspective and we would make the following observations:</i> <ul style="list-style-type: none"> ▪ The proposed site is located outside the safeguarding area for Aberdeen Airport; ▪ Construction activities and maintenance/repair carried out in port locations or wet storage areas located within the safeguarding area for Aberdeen may impact aerodrome safeguarding and should be considered. Detailed assessments may be required once these locations/activities are known. <i>Our position with regard to this proposal will only be confirmed once the development details are finalised and we have been consulted on a full planning application. At that time we will carry out a full safeguarding impact assessment and will consider our position in light of, inter alia, operation impact and cumulative effects.'</i>	Noted. The temporary mooring of FSSs and/or FOU's at dedicated locations (known as 'wet storage') for the Bellrock Project will be considered through separate consenting process(es) as required. The Applicant is not seeking consent for wet storage within this application, and it has not been included within the scope of this EIA Report. Any proposed projects in the public domain for wet storage facilities on the east coast of Scotland have been considered within the cumulative assessment along with other projects and plans (Appendix 5.3: Cumulative Effect Assessment Long List of Projects (Volume IV)).
Edinburgh Airport	Representation on the Bellrock WFDA Scoping Opinion (2024).	<i>'I can confirm the location of this development falls out with our Aerodrome Safeguarding zone for Edinburgh Airport therefore we have no objection/comment.'</i>	Noted.

Consultee	Date/Document	Comment	How/Where Comment is Addressed
DIO representing the MOD	Representation on the Bellrock WFDA Scoping Opinion (2024).	<p><i>'Wind turbines have been shown to have detrimental effects on the operation of AD radar. These include the desensitisation of the radar in the vicinity of wind turbines, and the creation of "false" aircraft returns. The probability of the radar detecting aircraft flying over or in the locality of the turbines would be reduced, hence turbine proliferation within a specific locality can result in unacceptable degradation of the radar's operational integrity. This would reduce the RAF's ability to detect and manage aircraft in United Kingdom sovereign airspace, thereby preventing it from effectively performing its primary function of Air Defence of the United Kingdom.</i></p> <p><i>Within paragraph 12.4.4 (968) of Chapter 12 [of the The Bellrock WFDA scoping report] it is stated that the nearest military AD radar is located at RRH Buchan which is approximately 117.2km from the closest point of the scoping array.</i></p> <p><i>The MOD has undertaken an assessment based on 80 wind turbines at 400m to tip height using the Rochdale Envelope boundary co-ordinates. Turbines within the array area will be detectable to the AD Radar at RRH Buchan. The impact of the turbines on the AD radar at RRH Buchan will therefore need to be addressed through a suitable technical mitigation solution. It is the applicant's responsibility to provide a suitable technical mitigation solution to the MOD.'</i></p>	<p>Impact to RRH Buchan is assessed further in Section 13.8 and Section 13.9.</p> <p>Subsequent to the Scoping Opinion, the Applicant reduced the maximum blade tip height from 400 m above MSL to 337 m above MSL (see Chapter 4: Project Description (Volume II)).</p> <p>This design change significantly reduces the footprint of the Bellrock WFDA that is in RLoS of RRH Buchan. See Section 13.8.2.3.4 for further information on secondary mitigation measures proposed.</p>
DIO representing the MOD	Representation on the Bellrock WFDA Scoping Opinion (2024).	<p><i>'Within paragraph 12.4.4 (965) of Chapter 12 [of The Bellrock WFDA scoping report] it is stated that the nearest military airfields are Leuchars Station which is approximately 171.8km to the westsouthwest of the Bellrock WFDA and RAF Lossiemouth which is approximately 211.1km to the northwest of the Bellrock WFDA.</i></p> <p><i>This paragraph acknowledges that the Bellrock WFDA will not be visible to the Primary Surveillance Radar (PSR) at both Leuchars Station and RAF Lossiemouth, the MOD agrees with this conclusion.'</i></p>	<p>Noted.</p> <p>Impact to Royal Air Force (RAF) Lossiemouth and RAF Leuchars has been scoped out in Table 13.8.</p>
DIO representing the MOD	Representation on the Bellrock WFDA Scoping Opinion (2024).	<p><i>'The potential for the development to create physical obstructions to military low flying aircraft activities is acknowledged within Chapter 12 Aviation and Radar, Paragraph 12.5 (978) [of The Bellrock WFDA scoping report]. To mitigate any potential impact, it is common practice that the MOD will request that a Requirement is added to any Development Consent Order that might be issued requiring the submission of information such as commencement dates, maximum turbine heights and the longitude and latitude of each wind turbine. This information is required to allow accurate charting of the development.</i></p>	<p>Military low flying activity is assessed in Section 13.8 and Section 13.9.</p> <p>It is noted that the Bellrock WFDA will seek s.36 Consent and a Marine Licence rather than a Development Consent Order.</p> <p>WTGs will be fitted with military accredited lighting. See Table 13.10.</p>

Consultee	Date/Document	Comment	How/Where Comment is Addressed
		<p><i>Paragraph 12.5.1 (981) acknowledges that the development will adhere to a lighting and marking plan (LMP) which will confirm compliance with legal requirements with regard to shipping, navigation and aviation marking and lighting. The MOD will request that the aviation warning lighting requirements is added as a Requirement to any Development Consent Order that might be issued.'</i></p>	
<p>DIO representing the MOD</p>	<p>Representation on the Bellrock WFDA Scoping Opinion (2024).</p>	<p><i>'Practice and Exercise Areas also known as PEXA, are designated areas of the sea where military exercises can be undertaken. Chapter 12 Aviation and Radar, Paragraph 12.4.1.3 [of The Bellrock WFDA scoping report] acknowledges MOD PEXAs. Chapter 13 Marine Infrastructure and Other Users, Paragraph 13.4.6 (1016) states that the scoping array project is not contained within the vertical limits of any military PEXA and, therefore military PEXA is scoped out of the EIA. The MOD agrees with this statement in relation to PEXA.'</i></p>	<p>Noted.</p>
<p>NATS</p>	<p>Representation on the Bellrock WFDA Scoping Opinion (2024).</p>	<p><i>'NATS (En Route) plc <u>objects to the proposal</u>. The reasons for NATS's objection are outlined in the attached report TOPA SG37263.</i></p> <p><i>We would like to take this opportunity to draw your attention to the legal obligation of local authorities to consult NATS before granting planning permission. The obligation to consult arises in respect of certain applications that would affect a technical site operated by or on behalf of NATS (such sites being identified by safeguarding plans that are issued to local planning authorities).</i></p> <p><i>In the event any recommendations made by NATS are not accepted, local authorities are obliged to follow the relevant directions within Planning Circular 2 2003 - Scottish Planning Series: Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 or Annex 1 - The Town And Country Planning (Safeguarded Aerodromes, Technical Sites And Military Explosives Storage Areas) Direction 2002.</i></p> <p><i>These directions require that the planning authority notify both NATS and the Civil Aviation Authority ("CAA") of their intention. As this further notification is intended to allow the CAA to consider whether further scrutiny is required, the notification should be provided prior to any granting of permission.</i></p> <p><i>It should also be noted that the failure to consult NATS, or to take into account NATS's comments when determining a planning application, could cause serious safety risks for air traffic.'</i></p>	<p>Noted.</p> <p>It is further noted that the Scottish Ministers will determine the Bellrock WFDA consent applications rather than the local authorities.</p>

Consultee	Date/Document	Comment	How/Where Comment is Addressed
NATS	Representation on the Bellrock WFDA Scoping Opinion (2024). Technical and Operational Assessment (TOPA)	<p><i>'Predicted Impact on Perwinnes RADAR: Using the theory as described in Appendix A and development specific propagation profile it has been determined that the terrain screening available will not adequately attenuate the signal, and therefore this development is likely to cause false primary plots to be generated. A reduction in the RADAR's probability of detection, for real aircraft, is also anticipated.</i></p> <p><i>En-route operational assessment of RADAR impact: Where an assessment reveals a technical impact on a specific NATS' RADAR, the users of that RADAR are consulted to ascertain whether the anticipated impact is acceptable to their operations or not.</i></p> <ul style="list-style-type: none"> ▪ Prestwick Centre ATC: Unacceptable ▪ Military ATC: Unacceptable ▪ Aberdeen ATC: Unacceptable <p><i>En-route Consultation: The proposed development has been examined by technical and operational safeguarding teams. A technical impact is anticipated, this has been deemed to be unacceptable.'</i></p>	<p>Impact to NATS Perwinnes is assessed in Section 13.8 and Section 13.9.</p> <p>Subsequent to the Scoping Opinion, the Applicant reduced the maximum blade tip height from 400 m above MSL to 337 m above MSL (see Chapter 4: Project Description (Volume II)).</p> <p>Subsequent to this design change, the Applicant has engaged NATS on the revised WTG parameters and NATS advise that their analysis shows that WTGs with a maximum blade tip height of 337 m above MSL, would be below RLoS and "even when we [NATS] apply ducting corrections the detection probability would low enough that it would not draw a NATS objection".</p>
NATS	Representation on the Bellrock WFDA Scoping Opinion (2024). Technical and Operational Assessment (TOPA)	<p>Note: The technical impact, as detailed above, has also been passed to non-NATS users of the affected RADAR, this may have included other planning consultees such as the MOD or other airports. Should these users consider the impact to be unacceptable it is expected that they will contact the planning authority directly to raise their concerns.</p>	Noted.
NATS	Representation on the Bellrock WFDA Scoping Opinion (2024). Technical and Operational Assessment (TOPA)	<p>Predicted Impact on Navigation Aids</p> <p>No impact is anticipated on NATS' navigation aids.</p>	Noted.
NATS	Representation on the Bellrock WFDA Scoping Opinion (2024). Technical and	<p>Predicted Impact on the Radio Communications Infrastructure</p> <p>No impact is anticipated on NATS' radio communications infrastructure.</p>	Noted.

Consultee	Date/Document	Comment	How/Where Comment is Addressed
	Operational Assessment (TOPA)		
NATS	Email Correspondence, 6 November 2025	Subsequent to the Scoping Opinion, the Applicant reduced the maximum blade tip height from 400 m above LAT to 337 m above MSL and has engaged NATS on the revised WTG parameters. <i>In response, NATS confirms that "NATS' analysis agrees that turbines 337m above MSL to tip would be below RLoS and even when we apply ducting corrections the detection probability would low enough that it would not draw a NATS objection."</i>	Noted. Impact to NATS Perwinnes is assessed in Section 13.8 and Section 13.9 .
Offshore Helicopter Services UK Limited	Email Correspondence 30 January 2026.	<i>'The OWF in isolation is unlikely to cause too many challenges. OWF development is being discussed between all operators and our broader concerns lies with what the end picture looks like once all OWFs have been developed and installed. In isolation though, I do not believe this would present too many significant issues. The size of the field would permit all aircraft types to transit over. Our recommendation to all fields is that consideration is given to careful mapping and notification of location for all turbines. Where possible, spacing should be considered for marine and aviation transit at low level. We are trying to tackle the latter point via a coordinated response to ensure suitable low level routes are provided once the holistic view of the OWFs is known.'</i>	Noted. Impact to low flying aircraft is assessed within Section 13.8 and Section 13.9 .

13.4 Assessment Methodology

13.4.1 Impact Assessment Methodology

14. **Chapter 5: EIA Methodology (Volume II)** provides a summary of the general impact assessment methodology applied in the Bellrock WFDA EIA Report. The assessment will use the conceptual ‘source-pathway-receptor’ model. The model identifies potential impacts resulting from the proposed activities on the environment and sensitive receptors within it.
15. Aviation and radar specific assessment criteria and recognised guidance on assessing military and civil aviation are provided below.

13.4.1.1 Definitions of Sensitivity and Magnitude

16. The characterisation of the existing environment helps to determine the receptor sensitivity in order to assess the potential impacts upon it.
17. Sensitivity is defined with regard to the ability of a receptor to adapt to change, tolerate, and/or recover from potential impacts. In addition, for some assessments the value of a receptor may also be an element to add to the assessment where relevant. The sensitivity of human activities to impacts associated with the Bellrock Wind Farm Infrastructure involves consideration of the value (or importance) of the receptor or activity, and the ability of the receptor or activity to accommodate the predicted change. The criteria for defining the sensitivity of a potential impact to infrastructure and other marine users is shown in below (**Table 13.3**).

Table 13.3: Definition of Sensitivity Levels for Aviation and Radar Receptors

Sensitivity	Definition
High	Receptor, or the activities of the receptor, is of high value to the local, regional or national economy and/or the receptor or the activities of the receptor, is generally vulnerable to impacts that may arise from the Bellrock Wind Farm Infrastructure and/or recoverability is slow and/or costly.
Medium	Individual receptor has limited capacity to avoid, adapt to, accommodate or recover from the anticipated impact. Receptor, or the activities of the receptor, is of moderate value to the local, regional or national economy and/or the receptor or the activities of the receptor, is somewhat vulnerable to impacts that may arise from the Bellrock Wind Farm Infrastructure and/or has moderate to high levels of recoverability.
Low	Receptor, or the activities of the receptor, is of low value to the local, regional or national economy and/or the receptor or the activities of the receptor, is not generally vulnerable to impacts that may arise from the Bellrock Wind Farm Infrastructure and/or has high recoverability.
Negligible	Receptor, or the activities of the receptor, is of negligible value to the local, regional or national economy and/or the receptor or the activities of the receptor, is not vulnerable to impacts that may arise from the Bellrock Wind Farm Infrastructure and/or has high recoverability.

18. The magnitude and probability of an impact occurring is established through consideration of:
- Scale or spatial extent (small scale to large scale or a few individuals to most of the population);
 - Duration (short term to long term);
 - Likelihood of impact occurring;
 - Frequency; and
 - Nature of change relative to the baseline.
19. Definitions of the magnitude levels are given in **Table 13.4**.

Table 13.4: Definition of the Magnitude Levels for an Aviation and Radar Receptor

Magnitude	Definition
High	Fundamental, permanent/irreversible changes, over the whole receptor, and/or fundamental alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Medium	Considerable, permanent/irreversible changes, over the majority of the receptor, and/or discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and/or limited but discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptor's character or distinctiveness.
No change	No measurable or discernible change from baseline conditions. The impact does not result in any alternation to the receptor.

13.4.1.2 Effect Significance

20. The potential significance of effect for a given impact, is a function of the overall sensitivity and the magnitude of the impact (see **Chapter 5: EIA Methodology (Volume II)** for further details). A matrix is used (**Table 13.5**) as a framework to determine the significance of an effect. Definitions of each level of significance are provided in **Table 13.6**. Impacts and effects may be either positive (beneficial) or negative (adverse). Impacts that are moderate or major adverse are considered to be significant in EIA terms.

Table 13.5: Matrix for Evaluating the Significance of an Effect

Sensitivity	Magnitude				
	High	Medium	Low	Negligible	No Change
High	Major	Major	Moderate	Minor	No effect
Medium	Major	Moderate	Minor	Negligible	No effect
Low	Moderate	Minor	Minor	Negligible	No effect
Negligible	Minor	Negligible	Negligible	Negligible	No effect

Table 13.6: Definitions of Effect Significance

Effect Significance	Definition
Major	Very large or large change in receptor condition or very large or large disturbance to an activity, both adverse or beneficial, which are likely to be important considerations at a regional or national level because they contribute to achieving national, regional or local objectives, or could result in exceedance of statutory objectives and/or breaches of legislation.
Moderate	Intermediate change in receptor condition or intermediate disturbance to an activity, which are likely to be important considerations at a local level.
Minor	Small change in receptor condition or small disturbance to an activity, which may be raised as local issues but are unlikely to be important in the decision-making process.
Negligible	No discernible change in receptor condition or disturbance to activity.
No Effect	No impact, therefore, no change in receptor condition or activity.

13.4.2 Cumulative Effects Assessment Methodology

21. The Cumulative Effects Assessment (CEA) considered the likely significant effects of impacts arising from the Bellrock Wind Farm Infrastructure cumulatively with other relevant plans, projects and activities. The general approach to the CEA for aviation and radar includes identifying potential cumulative effects, identifying a short list of plans and projects for consideration and evaluating the significance of cumulative effects. The screening for this Chapter has been based on a four-month cut off period for other projects and plans, which represents a shorter cut-off than the six months that was proposed in the Scoping Report (**Appendix 1.1: Bellrock WFDA Scoping Report (Volume IV)**). MD-LOT were consulted during the screening process as part of ongoing consultation in the pre-application phase. **Chapter 5: EIA Methodology (Volume II)** provides further details on the general approach to the CEA, including the CEA with the Bellrock Offshore Transmission Development Area (OfTDA) and Onshore Transmission Development Area (OnTDA).

22. The plans and projects selected as relevant to the CEA for aviation and radar are based upon the results of a screening exercise (see **Appendix 5.3: Cumulative Effects Assessment Long List of Projects (Volume IV)** for details). Each plan or project has been considered on a case-by-case basis for screening in or screening out of this assessment based upon data confidence, impact-receptor pathways and the spatial/temporal scales involved.
23. 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.
24. 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.
25. In line with the methodology set out in **Chapter 5: EIA Methodology (Volume II)**, three tiers had been applied to the Bellrock WFDA CEA. As the site selection process for the Bellrock OfTDA and Bellrock OnTDA is ongoing (see **Chapter 4: Project Description (Volume II)** for details), activities and infrastructure associated with the Bellrock OfTDA and Bellrock OnTDA were treated as 'other projects' for the purposes of the CEA, but had been considered within Tier 1 where relevant, due to their essential requirement for the function of the Bellrock Project.
26. The three tiers for CEA are:
 - Tire 1 assessment: The Bellrock WFDA plus plans/projects which are operational, under construction, those with consent or consent applications submitted but not yet determined, plus the Bellrock OfTDA and Bellrock OnTDA;
 - Tier 2 assessment: The Bellrock WFDA plus all plans/projects assessed under Tier 1, plus those projects with a Scoping Report and/or Scoping Opinion; and
 - Tier 3 assessment: The Bellrock WFDA plus all plans/projects assessed under Tier 1 and Tier 2, plus those projects likely to come forward where a Crown Estate Scotland (CES) Option to Lease Agreement or equivalent has been granted.

13.4.3 Transboundary Effects Assessment Methodology

27. The transboundary effects assessment considers the potential for effects to occur as a result of the Bellrock Wind Farm Infrastructure on aviation and radar within the Exclusive Economic Zone of other European Economic Area member states or other interests of European Economic Area member states.
28. For aviation and radar, there is no potential for impacts on transboundary receptors. The Bellrock WFDA is located a significant distance from the nearest Exclusive Economic Zone of another state and therefore, transboundary effects have been scoped out. This has been agreed with MD-LOT (see **Table 13.2**) as part of the Scoping Opinion (**Appendix 1.2: Bellrock WFDA Scoping Opinion (Volume IV)**).

13.5 Scope of the Assessment

13.5.1 Study Area

13.5.1.1 Overview

29. **Figure 13.1 (Volume III)** shows the aviation and radar study area. This includes above sea level Wind Farm Infrastructure within the Bellrock WFDA.
30. In considering the spatial coverage of the aviation and radar study area, the overriding factor is the potential for WTGs within the Bellrock WFDA to have an impact on civil and military radars, considering required radar operational ranges. In general, PSRs installed on civil and military airfields have an operational range of between 40 nm (74.1 km) and 60 nm (111.1 km). All radar equipped airfields within 60 nm (111.1 km) are therefore included in the study area. En route radars operated by NATS, and military AD radars are required to provide coverage at ranges in excess of 60 nm (111.1 km) and so all such radars with potential RLoS of WTGs in the Bellrock WFDA are also included in the study area.
31. The aviation and radar study area is also defined by the Bellrock WFDA footprint, together with the airspace between the Bellrock WFDA and the UK mainland. The study area extends from NATS Allanshill to the northwest, to Aberdeen International Airport to the west of the Bellrock WFDA.

13.5.1.2 Civil Aerodromes

32. CAP 764: Policy and Guidelines on Wind Turbines (CAA, 2025) states the distances from various types of aerodromes for WTG developments where consultation should take place. These distances include:
- Aerodromes with a surveillance radar – within 30 km;
 - Licensed aerodromes where the WTGs will lie within airspace coincidental with any published instrument flight procedure (IFP);
 - Non-radar equipped licensed aerodrome with a runway of 1,100 m or more – within 17 km;
 - Non-radar equipped licensed aerodrome with a runway of less than 1,100 m – within 5 km;
 - Unlicensed aerodromes with runways of more than 800 m – within 4 km;
 - Unlicensed aerodromes with runways of less than 800 m – within 3 km;
 - Gliding sites – within 10 km; and
 - Other aviation activity such as parachute sites and microlight sites – within 3 km.
33. CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all WTG developments will be approved or within which they will always be objected to. For example, individual aerodromes may utilise their radars at ranges considerably in excess of 30 km.

34. As well as examining the technical impact of WTGs on ATC facilities, it is also necessary to consider the physical safeguarding of ATC operations using criteria laid down in CAP 168: Licensing of Aerodromes (CAA, 2022) to determine whether a proposed development has the potential to breach obstacle clearance criteria at any aerodromes.

13.5.1.3 Ministry of Defence

It is necessary to take into account the aviation and AD activities of the MOD. This includes:

- MOD airfields, both radar and non-radar equipped;
- MOD AD radars; and
- MOD practice and exercise areas (PEXAs) for both aviation and non-aviation activities.

13.5.1.4 NATS Facilities

35. It is necessary to consider the possible impacts of WTGs upon NATS en route electronic infrastructure – a UK-wide network of primary and secondary radars and navigation facilities.

13.5.1.5 Other Aviation Activities

36. Other aviation activities under consideration include:

- General military low flying training operations; and
- Military and civilian ‘offroute’ fixed wing and helicopter operations, SAR missions and offshore helicopter operations in support of offshore wind developments and the oil and gas industry.

13.5.2 Data and Information Sources

37. For the purpose of this Chapter, a desk-based review was undertaken using relevant data sources. The primary sources of aviation related data used for the desktop study are the UK civil and military AIPs. The AIPs contain details on airspace and en-route procedures as well as charts and other air navigation information. **Table 13.7** sets out the key desk-based information and data sources that have been used to inform the aviation and radar baseline.

Table 13.7: Key Data and Information Sources for Aviation and Radar

Dataset	Year(s)	Description
CAP 032: UK AIP, CAA	2025	Contains information on facilities, services, rules, regulations and restrictions in UK airspace.
UK Military AIP, MOD	2025	The main resource for information and flight procedures at all UK military aerodromes.
Wind farm self-assessment maps, NATS	2012	Maps provided by NATS to ascertain potential impact of WTGs on their en-route electronic infrastructure.

Dataset	Year(s)	Description
Offshore infrastructure data, North Sea Transition Authority	2025	Regularly updated North Sea Transition Authority offshore shapefiles.
Office of Communications (Ofcom), Protected Radar List, Ofcom	2024	Lists the locations and antenna heights of UK civil and military PSRs.
Helideck Certificates, Helideck Certification Agency (HCA)	2025	Contains helideck certificated for offshore oil and gas platforms.

13.5.2.1 Assumptions and Limitations

38. No overarching assumptions or limitations have been identified that apply to the assessment for aviation and radar. The data used are the most up to date publicly available information which can be obtained from the applicable data sources as cited. The data employed in the assessment are considered robust and sufficient for purpose.

13.6 Existing Environment

39. A summary of the aviation and radar baseline environment is provided in the following sections. Full details of the analysis undertaken to develop the aviation and radar baseline is provided in **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)**.

13.6.1 Civil Aviation

40. The airspace above and adjacent to the Bellrock WFDA is used by both civil and military aircraft and lies within the Scottish FIR for ATC. This airspace is regulated by the UK CAA. The Scottish FIR is adjacent to the Polaris FIR, regulated by CAA Norway. The boundary of the Polaris FIR is located 221.1 km to the northeast of the Bellrock WFDA.
41. Airspace is classified as either controlled or uncontrolled and is divided into a number of classes depending on what kind of ATS is provided and under what conditions. In the UK there are five classes of airspace: specifically; A, C, D, E and G. The first four are controlled airspace while Class G is uncontrolled. Within controlled airspace, aircraft are monitored and instructed by ATC. Aircraft within uncontrolled airspace, are not subject to ATC instruction but rather operate according to a simple set of regulations. ATC may still provide information, if requested, to ensure flight safety.
42. Aircraft operate under one of two flight rules:
- Visual flight rules (VFR); or
 - Instrument flight rules (IFR).
43. VFR flight is permitted when the weather satisfies visual meteorological conditions (VMC) and is conducted with visual reference to the natural horizon. Aircraft must be flown under IFR when

weather restricts visibility, known as instrument meteorological conditions (IMC). IFR flight requires reference solely to aircraft instrumentation.

44. From sea level to flight level (FL) 195 (approximately 19,500 ft above MSL), the airspace above the Bellrock WFDA is Class G uncontrolled airspace. This airspace is predominately used by low level flight operations and generally by aircraft flying under VFR. Under VFR, pilots fly and navigate with reference to the natural horizon and terrain features. Pilots are required to maintain minimum distances from notified obstacles, including WTGs, and may only fly within the minimum weather and visibility criteria.
45. The airspace above FL 195 (approximately 19,500 ft above MSL), over the Bellrock WFDA is Class C controlled airspace, in the form of Temporary Reserved Area 007B. Temporary Reserved Area 007B has an upper vertical limit of FL 245 (approximately 24,500 ft above MSL) and is available for use by both military and civil aircraft, though its main use is to accommodate VFR military flying activity.
46. Above FL 245 (approximately 24,500 ft above MSL) is Class C upper airspace which has an upper limit of FL 660 (approximately 66,000 ft above MSL).
47. There are two transponder mandatory zones (TMZs) associated with offshore wind farms in the vicinity of the Bellrock WFDA. Located 82.2 km and 134.5 km to the southwest of the Bellrock WFDA are the Seagreen Phase 1 TMZ and Neart na Gaoithe TMZ respectively. Within a TMZ, the carriage and operations of aircraft transponder equipment is mandatory. This enables such aircraft to be detected and tracked by secondary surveillance radar (SSR) systems. The Seagreen Phase 1 TMZ surrounds the Seagreen Phase 1 offshore wind farm (OWF) and the Neart na Gaoithe TMZ surrounds the Neart na Gaoithe OWF. These TMZs are used to mitigate the impact the associated WTGs have on PSR. Both of these TMZs are active from sea level to FL 100 (approximately 10,000 ft above MSL).
48. The nearest civil airport to the Bellrock WFDA is Aberdeen International Airport, located 127.8 km to the west as shown in **Figure 13.1 (Volume III)**. Aberdeen International Airport is Scotland's third busiest airport, the 16th busiest in the UK, and is the main heliport for the North Sea oil and gas industry.
49. NATS provides en route civil ATS within the Scottish FIR and operates a network of radar facilities providing information for ATC on both civil and military aircraft. The nearest NATS radar facilities to the Bellrock WFDA are Perwinnes and Allanshill, situated 124.2 km to the west and 146.2 km to the northwest respectively (**Figure 13.2 (Volume III)**).
50. As part of their scoping response, NATS provided a TOPA which indicated that WTGs with a maximum blade tip height of 400 m above MSL would be within RLoS of Perwinnes. RLoS analysis conducted in **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)** determined that WTGs with a maximum blade tip height of 337 m above MSL within the Bellrock WFDA will not be within RLoS of Perwinnes.

13.6.2 Military Aviation

51. Above the Bellrock WFDA is the Central Complex. This danger area is one of four such complexes in UK airspace that when activated, provide segregated airspace for military flight training. The Bellrock WFDA is located below Danger Area D613B and D613C which both have a lower limit of FL 100 (approximately 10,000 ft above MSL) and an upper limit of FL 660 (approximately 66,000 ft above MSL). Activities within these areas includes high energy manoeuvres, ordnance, munitions and explosives.
52. The Bellrock WFDA is located within the vicinity of Air-to-Air Refuelling Areas (AARAs) 03, 04, and 05, situated 75.6 km to the northwest, 80.8 km to the south, and 100.7 km to the northwest respectively. AARA 03 has a lower limit of FL 100 and an upper limit of FL 290 (approximately 10,000 ft and 29,000 ft respectively). AARA 04 and 05 have lower limit of FL 70 and an upper limit of FL 240 (approximately 7,000 ft and 24,000 above MSL respectively).
53. The nearest radar equipped military airfield to the Bellrock WFDA is Leuchars Station (formerly RAF Leuchars), located 171.8 km to the southwest. RLoS analysis conducted in the scoping stage determined that Bellrock WTGs will not be within RLoS of Leuchars Station. The MOD stated within their scoping response that they agree with this conclusion.
54. The closest MOD AD radar to the Bellrock WFDA is RRH Buchan, situated 117.4 km to the northwest. RLoS analysis conducted in **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)** indicate that WTGs with a maximum blade tip height of 337 m above MSL located within the northwest corner of the Bellrock WFDA (within an area of 3.93 km²) will be within RLoS of RRH Buchan (**Figure 13.3 (Volume III)**).

13.6.3 Helicopter Main Routing Indicators

55. Most of the Bellrock WFDA is located within the Aberdeen Offshore Safety Area (OSA), which has a vertical limit of sea level to FL 100 (approximately 10,000 ft above MSL). The Aberdeen OSA is the busiest airspace in terms of offshore helicopter traffic and contains a network of offshore routes over the North Sea that are flown by helicopters in support of oil and gas installations. These routes are published on charts as helicopter main routing indicators (HMRI) and, together with the OSA, alert other airspace users of the potential for frequent low-level helicopter traffic.
56. The Bellrock WFDA is overlapped by the centrelines of HMRI 113 and 116.

13.6.4 Offshore Helidecks

57. To help achieve a safe operating environment, a 9 nm consultation zone for planned obstacles exists around offshore helicopter destinations. Within 9 nm, obstacles such as WTGs can potentially impact upon the feasibility of helicopters to safely fly low visibility or missed approach procedures at the associated helideck site. There are no offshore platforms within 9 nm of the Bellrock WFDA. The nearest offshore helideck is Catcher, located 13.3 nm to the east of the Bellrock WFDA.

13.6.5 Search and Rescue

58. There are ten SAR helicopter bases around the UK with Bristow Group providing helicopters and aircrew. The nearest SAR base to the Bellrock WFDA is at Inverness Airport, located 241.1 km to the northwest.

13.6.6 Predicted Future Baseline

59. Although the aviation industry is under long-term pressure to reduce its contribution to climate change, this is not considered to have significant implications to the aviation and radar baseline described above.
60. As oil and gas infrastructure is decommissioned, this will potentially reduce the volume of helicopter traffic to and from offshore platforms. However, this may be offset by the traffic associated with offshore wind farms. An increase in low-level autonomous drone traffic can also be foreseen.

13.7 Potential Impacts

13.7.1 Scope

61. WTGs have the potential to cause a variety of effects on aviation and radar receptors. WTGs can impact the radars used by civilian and military air traffic controllers because the characteristics of moving WTG blades are similar to those of aircraft, leading to spurious returns, or clutter, on radar displays.
62. This can affect the safe provision of air traffic services (ATS) or interfere with the tracking of aircraft by the military. WTGs can also have the potential to present a physical obstruction for aviation activities such as military low flying or helicopter search and rescue (SAR) operations.
63. **Table 13.8** sets out the impacts that have been scoped in to and scoped out of the Bellrock WFDA EIA Report, in line with the Scoping Opinion (**Appendix 1.2: Bellrock WFDA Scoping Opinion (Volume IV)**).
64. Relevant stakeholder consultation (**Section 13.3**), the Bellrock WFDA Scoping Report (**Appendix 1.1: Bellrock WFDA Scoping Report (Volume IV)**) the Bellrock WFDA Scoping Opinion (**Appendix 1.2: Bellrock WFDA Scoping Opinion (Volume IV)**), along with understanding of worst-case design scenarios and environmental baseline conditions has informed the decision to scope these impacts in/out for further consideration in the EIA for aviation and radar.

Table 13.8: Potential Impacts Scoped In and Scoped Out of the EIA for Aviation and Radar as Agreed in the Bellrock Wind Farm Development Area Scoping Opinion

Potential Impact	Construction	Operation and Maintenance	Decommissioning
	Advised within the Bellrock WFDA Scoping Opinion		
Creation of an aviation obstacle environment	✓	✓	x
Increased air traffic in the area in relation to wind farm activities	✓	✓	✓
Impact on NATS Perwinnes	x	x	x
Impact on RRH Buchan	x	✓	x
Impact on civil and military SSRs	x	x	x
Impact on MOD PEXAs	x	x	x
Impact on weather radars	x	x	x
Transboundary impacts	x	x	x

13.7.2 Realistic Worst-case Scenario

65. The final design of the Bellrock Wind Farm Infrastructure will be confirmed during detailed engineering studies post-consent. In order to undertake a robust and precautionary impact assessment, the realistic worst-case design scenario has been defined. Realistic worst-case scenario (i.e. those that have potential to cause the greatest impact) are derived from the project design envelope to ensure that all other design scenarios would have equal or less impact. Please see **Chapter 5: EIA Methodology (Volume II)** for further details on the design envelope approach.
66. The realistic worst-case scenario for the aviation and radar assessment is summarised in **Table 13.9** below and based on the project design as described in **Chapter 4: Project Description (Volume II)**.

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Table 13.9: Realistic Worst-case Scenario for Impacts on Aviation and Radar

Impact	Realistic Worst-case Scenario	Rationale
Construction		
Impact C1: Creation of an aviation obstacle environment.	<ul style="list-style-type: none"> ▪ WTGs with a maximum blade tip height of 337 m above MSL; and ▪ Maximum of 132 WTGs within the Bellrock WFDA. 	Maximum physical obstruction to aviation operations due to the size and number of above sea level infrastructure within the Bellrock WFDA.
Impact C2: Increased air traffic in the area in relation to wind farm activities.	<ul style="list-style-type: none"> ▪ Maximum of 816 helicopter round trips¹ during the construction phase. 	Maximum number of helicopter trips engaged in the construction phase of the Bellrock Wind Farm Infrastructure causing increased possibility of aircraft-to-aircraft collision.
Impact C3: Impact on civil and military PSRs.	<ul style="list-style-type: none"> ▪ WTGs with a maximum blade tip height of 337 m above MSL; and ▪ Maximum of 132 WTGs by the end of the construction phase. 	These parameters represent the worst-case for height of infrastructure within the Bellrock WFDA which has the greatest potential for interference with radar systems.
Operation and Maintenance		
Impact O1: Creation of an aviation obstacle environment.	<ul style="list-style-type: none"> ▪ WTGs with a maximum blade tip height of 337 m above MSL; and ▪ Maximum of 132 WTGs within the Bellrock WFDA. 	Maximum physical obstruction to aviation operations due to the size and number of above sea level infrastructure within the Bellrock WFDA.
Impact O2: Increased air traffic in the area in relation to wind farm activities.	<ul style="list-style-type: none"> ▪ Maximum of 986 round trips¹ per year during the O&M phase. 	Maximum number of helicopter trips engaged in the O&M phase of the Bellrock Wind Farm Infrastructure causing increased possibility of aircraft-to-aircraft collision.
Impact O3: Impact on civil and military PSRs.	<ul style="list-style-type: none"> ▪ WTGs with a maximum blade tip height of 337 m above MSL; and ▪ Maximum of 132 WTGs within the Bellrock WFDA. 	These parameters represent the worst-case for height of infrastructure within the Bellrock WFDA which has the greatest potential for interference with radar systems.

Impact	Realistic Worst-case Scenario	Rationale
Decommissioning		
Impact D1: Increased air traffic in the area in relation to wind farm activities.	<ul style="list-style-type: none"> ▪ Maximum of 816 helicopter round trips¹ during the decommissioning phase. 	Maximum number of helicopter trips engaged in the decommissioning phase of the Bellrock Wind Farm Infrastructure causing increased possibility of aircraft-to-aircraft collision.
<p>Notes:</p> <p>¹ A helicopter round trip is comprised of two movements, one to and one from the Bellrock WFDA.</p> <p>² Site preparation works will commence up to one year before commencement of construction (year 0), at which point they may continue albeit as construction works (rather than site preparation works) these activities have been considered in the assessments of this Chapter, for completeness.</p>		

13.7.3 Embedded Mitigation Measures

67. This section outlines the embedded (primary and tertiary) mitigation relevant to the aviation and radar assessment (as shown in **Table 13.10** below). Where secondary mitigation measures are proposed, these are detailed in the impact assessment (**Section 13.8**). **Appendix 5.1: Mitigation and Monitoring Register (Volume IV)** sets out all mitigation measures.
68. The Applicant has identified several measures to avoid, prevent, reduce or, if possible, offset potential adverse environmental effects through mitigation measures embedded into the evolution of the design envelope. These embedded mitigation measures include actions that will be undertaken to meet other existing legislative requirements and those considered to be standard or best practice to manage commonly occurring environmental effects.

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Table 13.10: Embedded Mitigation Measures Relevant to Aviation and Radar

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-14	Development of and adherence to an Inter-array Cable Plan (IA-CaP). The IA-CaP will set out detailed IAC installation methods and techniques (based on final project design). The IA-CaP will confirm planned IAC routing, burial (if any), and any additional protection if required, and will set out methods for post-installation IAC monitoring.	Tertiary	Secured in the s.36 Consent and Marine Licence, via a condition requiring an IA-CaP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.
WFDA-40	Development of, and adherence to, an LMP. The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting. Failures of the lighting and marking within the Bellrock WFDA will be appropriately reported and rectified as soon as practicable. Interim hazard warnings will be put in place as required.	Tertiary	Secured in the s.36 Consent and Marine Licence, via a condition requiring a LMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An Outline LMP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
WFDA-42	Development of, and adherence to, an Emergency Response Cooperation plan (ERCoP). The ERCoP will detail protocols that will be undertaken in the event of an emergency, including occupational health and safety (H&S), and set out clear roles and responsibilities, emergency contacts and reporting and escalation pathways. Protocols for extreme weather events will also be included. The ERCoP will mitigate the risk of climate change impacts on construction site personnel, plant and equipment and other assets and the risk of delays to the construction programme due to extreme weather events, which are becoming more frequent and intense due to climate change. The ERCoP will ensure the implementation of response protocols in the event of emergencies for offshore activities.	Tertiary	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). An Outline VMNSP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-46	<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>	Tertiary	<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>
WFDA-47	<p>Development of, and adherence to, a Decommissioning Programme (DP).</p> <p>The DP 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> <p>Climate change risk measures will be included in the DP to be developed prior to the commencement of construction and will include a review of site-specific weather and metocean conditions, recent extreme weather events and up-to-date climate change projection data will be undertaken to ensure risk assessments, H&S protocols and guidelines on safe working practices are suitable for future climate conditions at the time of decommissioning works. The DP will be refreshed prior to decommissioning activities commencing.</p> <p>The DP will mitigate the risk of climate change impacts on decommissioning site personnel, plant and equipment and other assets and the risk of delays to the decommissioning programme due to extreme weather events, which are becoming more frequent and intense due to climate change.</p>	Tertiary	<p>Secured in the s.36 Consent and Marine Licence, via a condition requiring a DP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.</p>
WFDA-49	<p>Appropriate marking of the Bellrock WFDA on aeronautical charts. This will include provision of the positions and heights of structures to Civil Aviation Authority, Ministry of Defence, and Defence Geographics Centre.</p>	Tertiary	<p>Secured in the s.36 Consent and Marine Licence, via a condition requiring a LMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.</p>

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-50	No more than two non-rotating FOU's will be towed together at once and will not exceed a velocity of 10 knots.	Primary	Secured in the s.36 Consent and Marine Licence via a condition requiring a Vessel Management Plan (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.
WFDA-51	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.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a LMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An Outline LMP (Volume V) is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
WFDA-52	The layout of the WTGs in the Bellrock WFDA, will be finalised in discussion with the MCA and NLB to ensure the specific layout is compatible with potential search and rescue activity.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a Development Specification and Layout Plan (DSLPL) to be developed and submitted to the Scottish Ministers for approval before commencement of construction.
WFDA-60	Development of, and adherence to, a Construction Method Statement (CMS). The CMS will describe the methods for construction for all consented Wind Farm Infrastructure and set out the measures to be implemented to avoid or reduce adverse effects on the environment and legitimate users of the sea during the construction phase. This will include a clear definition of roles and responsibilities and reference to relevant H&S protocols. In relation to climate change, the CMS will incorporate measures to ensure construction activities are resilient to current and projected extreme weather and metocean conditions.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a CMS to be developed and submitted to the Scottish Ministers for approval before commencement of construction.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
	<p>This will include, as appropriate:</p> <ul style="list-style-type: none"> ▪ Monitoring of site-specific weather and metocean conditions, including use of recognised forecasting and severe weather alert services; ▪ Programming and phasing of construction activities with regard to seasonality and short-to medium-term forecasts; ▪ Definition of safe working limits for vessel, lifting, and installation operations and procedures for suspension of works where thresholds are exceeded; ▪ Measures to secure plant, equipment, and materials during adverse weather; and ▪ Risk assessments and safety procedures that account for site-specific extreme weather risks. <p>Through these measures, the CMS will mitigate risks to construction personnel, plant, and equipment, and reduce the potential for programme disruptions arising from extreme weather events.</p>		
WFDA-61	<p>Regular and periodic inspections and maintenance of all components of the Wind Farm Infrastructure will be undertaken over their operational lifetime to identify and remediate any damage and deterioration and maintain good working conditions. These will be included in the Operation and Maintenance Plan (OMP).</p> <p>Monitoring of site-specific weather and metocean conditions, recent extreme weather events and up-to-date climate change projection data will be undertaken to provide a dynamic risk assessment of climate change impacts and inform operation and maintenance planning.</p> <p>The OMP will mitigate the risks of climate change impacts on the conditions and performance of the Wind Farm Infrastructure and ensures that it is adaptable to future climate conditions and remains resilient over its operational life. The O&M strategy will be adaptive, with the frequency of maintenance, repair and replacement activities being adjusted based on need (i.e. increasing planned O&M visits for components with higher deterioration rates than anticipated).</p>	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring an OMP to be developed and submitted to the Scottish Ministers for approval prior to the commissioning of the first WTG.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-68	<p>NATS has confirmed Perwinnes will not have RLoS of WTGs within the Bellrock WFDA.</p> <p>As part of the detailed design of the Wind Farm Infrastructure undertaken post consent, should the RLoS impact on RRH Buchan require mitigation, the Applicant would not position WTGs with an equivalent tip height of 320 m above MSL within the RRH Buchan RLoS.</p> <p>In the event that DIO consider that a materially larger area of the Bellrock WFDA presents RLoS impact on RRH Buchan, the Applicant will consider mitigating the impact through new AD infrastructure procured under Programme NJORD, with the cost of such Programme NJORD deployment being borne by the UK Government.</p>	Secondary	Secured in the s.36 Consent via a condition requiring an obstacle free area (if required) for WTGs with an equivalent blade tip height of 320 m above MSL.

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13.8 Assessment of Effects

69. The potential effects to aviation and radar that may occur during construction, O&M and decommissioning of the Bellrock Wind Farm Infrastructure are assessed in the following sections. The assessment follows the methodology set out in **Section 13.4** and is based on the realistic worst-case scenarios defined in **Section 13.7.2**, with consideration of embedded mitigation measures identified in **Section 13.7.3**.

13.8.1 Potential Impacts During Construction

13.8.1.1 Impact C1: Creation of an Aviation Obstacle Environment

70. Construction of the Bellrock Wind Farm Infrastructure may involve tall heavy lift vessels (HLVs) to assist in the installation of Bellrock Wind Farm Infrastructure within the WFDA (i.e. driven pile installation during the construction phase, or major repairs during the O&M phase). From a starting point of no Wind Farm Infrastructure within the Bellrock WFDA, to the Wind Farm Infrastructure outlined in **Table 13.9** over the seven-year construction (plus one year site preparation) period. This may pose a physical obstruction to low flying aircraft, increasing the risk of collision or requiring aircraft to fly extended routes to avoid obstacles.

71. Specifically, permanent or temporary obstacles may increase the collision risk for:

- General military low flying training operations;
- Helicopter traffic utilising HMRI 113 and 116; and
- Other offshore fixed wing and helicopter operations, including those undertaking SAR operations over the North Sea.

13.8.1.1.1 Sensitivity

72. Embedded mitigation measures with respect to notification, charting, marking and lighting will make all pilots aware of the addition of infrastructure to the Bellrock WFDA, and it is reasonably assumed that pilots will comply with aviation regulatory requirements. The ultimate responsibility for seeing and avoiding obstacles rests with captains of civilian and military aircraft. Under the UK Standardised Rules of the Air Regulation (CAA, 2024) helicopters (like all aircraft) are required to avoid all structures, such as WTGs, by a minimum distance of 500 ft.
73. Military low flying and SAR and other offshore helicopter operations are deemed to be low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.8.1.1.2 Magnitude of Impact

74. As detailed in **Table 13.10**, potential impacts on low flying aircraft in the vicinity of the Bellrock WFDA will be mitigated through the development of an LMP in agreement with key aviation stakeholders, and through the provision of the positions and heights of structures to the CAA, MOD and DGC to enable appropriate marking on aeronautical charts. The LMP will cover the

lighting and marking of construction equipment such as tall cranes, and lighting and marking of WTGs in use during the construction period. An **Outline LMP** is provided in **Volume V**.

75. Lighting of WTGs will consider MOD and SAR requirements, and the final WTG layout (including FOU's installed during the construction phase) will be compatible with SAR helicopter operations. An ERCoP will be developed and implemented for all phases of the Bellrock Wind Farm Infrastructure.
76. Helicopters utilising HMRI's that route over the Bellrock WFDA must remain at least 1,000 ft vertically clear of obstacles when flying IFR and 500 ft clear when flying VFR. Assuming a maximum blade tip height of 337 m (1,105.64 ft) above MSL, this equates to helicopter minimum altitudes of 2,200 ft (IFR) and 1,700 ft (VFR). HMRI's are typically flown at altitudes between 1,500 ft and FL 60 (approximately 6,000 ft above MSL); however, helicopters may occasionally be required to operate below 1,500 ft to avoid icing conditions. Under these conditions, helicopters with limited icing capability may be unable to fly over the Bellrock WFDA, restricting the available HMRI's and requiring them to fly an extended route to their destination.
77. CAP 764 (CAA, 2025) states that HMRI's are essentially used by ATS providers and helicopter operations for flight planning and management purposes although in most cases operationally helicopter operators will be provided with direct routings. HMRI's have no lateral dimensions. Where helicopters are required to operate below 1,500 ft, pilots are often asked to follow HMRI to enable procedural separation if the aircraft is outside ATS communications and surveillance coverage. The Applicant has reached out to the central North Sea helicopter operators to determine whether the presence of the Bellrock Wind Farm Infrastructure may necessitate any mitigation. Initial feedback indicates that appropriate charting and lighting should address any concerns with respect to the Bellrock Wind Farm Infrastructure in isolation although a low-level transit route would be desirable (which also reflects MCA ERCoP requirements including SAR access lanes). The final layout of WTGs will take into account any such mitigation requirements and will also ensure the compatibility with possible SAR helicopter operations within the Bellrock WFDA.
78. The impact is considered to be of local spatial extent (i.e. limited to the aviation and radar study area), short to medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.8.1.1.3 Significance of Effect

79. The sensitivity of the receptor is deemed to be medium, and the magnitude of the impact is low. The effect will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.8.1.2 Impact C2: Increased Air Traffic in the Area in Relation to Wind Farm Activities

80. The construction of the Bellrock Wind Farm Infrastructure will see a maximum of 816 helicopter round trips per year during the construction period.
81. This possible increase in air traffic associated with the construction phase brings with it a potential increased possibility of aircraft collision in airspace around the Bellrock WFDA.

13.8.1.2.1 Sensitivity

82. Helicopter support operations and existing air traffic are deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.8.1.2.2 Magnitude of Impact

83. The predicted helicopter movements during the construction phase will be managed by existing ATS infrastructure provided in accordance with national procedures, and pilots will be expected to operate in accordance with regulatory requirements.
84. The impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), short to medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.8.1.2.3 Significance of Effect

85. The sensitivity of the receptor is deemed to be medium, and the magnitude of the impact is low. The effect will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.8.1.3 Impact C3: Impact on Military and Civil PSR

86. As WTGs are installed during the construction phase, there will be an overlap with the operation and maintenance phase in which some WTGs will become operational.
87. The Bellrock WFDA is located within operational range of radar systems serving both civil and military agencies.
88. The TOPA produced by NATS (detailed in **Table 13.2**) determined that WTGs with the scoping tip height of 400 m above MSL may be within RLoS of NATS Perwinnes. Since the scoping stage, the maximum blade tip height considered for WTGs within the Bellrock WFDA has been reduced to 337 m above MSL. RLoS analysis detailed in **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)** shows that WTGs with a maximum blade tip height of 337 m above MSL will not be within RLoS of NATS Perwinnes. This modelling was presented to NATS in which they agreed with the results via email correspondence (6 November 2025). NATS also advised that the Bellrock Wind Farm Infrastructure would '*not draw a NATS objection*'. The full response from NATS is listed in **Table 13.2**. The potential impact to NATS Perwinnes is therefore not considered further within this EIA.
89. RLoS analysis conducted within **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)** indicated that WTGs with a maximum blade tip height of 337 m above MSL within the northwest corner of the Bellrock WFDA (comprising of an area of 3.93 km²) will be within RLoS of military AD RRH Buchan.

13.8.1.3.1 Sensitivity

90. Within their scoping response the MOD stated that they agree with the impact identified to RRH Buchan as highlighted in **Table 13.2**, which may result in an unacceptable degradation of the radar's operational capability.

91. PSRs are deemed to be of high vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be high.

13.8.1.3.2 Magnitude of Impact

92. When operational (i.e. with WTG blades rotating), WTGs have the potential to generate ‘clutter’ (or false targets) upon radar displays because current generation PSRs cannot easily differentiate between the moving blades of WTGs and aircraft. As a consequence, radar operators may be unable to distinguish between primary radar returns generated by WTGs and those generated by aircraft. This may compromise the ability of the MOD to undertake its AD role.
93. The impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be high.

13.8.1.3.3 Significance of Effect

94. The sensitivity of the receptor is deemed to be high and the magnitude of the impact is high. The effect will therefore be of **major adverse significance**, which is significant in EIA terms.

13.8.1.3.4 Secondary Mitigation

95. As discussed above, WTG Type 2 (with an equivalent tip height of 337 m above MSL) may be detected in a small section on the northwest corner of the Bellrock WFDA (comprising of an area of 3.93 km²). RLoS modelling shows that WTGs with a tip height of 318 m above HAT (i.e. an equivalent tip height of 320 m above MSL) and below, will not be within RLoS of RRH Buchan in this area.
96. As part of the detailed design of the Wind Farm Infrastructure undertaken post consent, should the RLoS impact on RRH Buchan require mitigation, the Applicant would not position WTGs with an equivalent tip height of 320 m above MSL within the RRH Buchan RLoS shown on **Figure 13.2 (Volume III)** and discussed in **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)**. In the event that DIO consider that a materially larger area of the Bellrock WFDA presents RLoS impact on RRH Buchan, the Applicant will consider mitigating the impact through new AD infrastructure procured under Programme NJORD, with the cost of such Programme NJORD deployment being borne by the UK Government².
97. Once mitigation solutions are implemented, the sensitivity of the receptor is deemed to be high, and the magnitude of the impact is negligible, and the sensitivity of the receptor is high. The effects will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

² The Clean Energy 2030 action plan and National Policy Statement (NSP) for Energy (EN) 1 (2025) states that the full costs of the long-term radar mitigation solutions identified by Programme NJORD will be funded via an alternative route delivered by the UK Government, and therefore the associated funding requirement is removed from offshore wind developers.

13.8.2 Potential Impacts During Operation and Maintenance

13.8.2.1 Impact O1: Creation of an Aviation Obstacle Environment

98. During the O&M phase, the Wind Farm Infrastructure outlined in **Table 13.9** will be present within the Bellrock WFDA. This may pose a physical obstruction to aircraft utilising the airspace in the vicinity of the Bellrock Wind Farm Infrastructure. Tall cranes and HLVs may be used to assist in the during the O&M phase.
99. Specifically, obstacles within the Bellrock WFDA may increase collision risk for:
- General military low flying training and operations;
 - Helicopters utilising HMRI 113 and 116; and
 - Offshore fixed wing helicopter operations, including those undertaking SAR operations over the North Sea.

13.8.2.1.1 Sensitivity

100. Embedded mitigation measures with respect to notification, charting, marking and lighting will make all pilots aware of the Bellrock Wind Farm Infrastructure, and it is reasonably assumed that pilots will comply with aviation regulatory requirements. The ultimate responsibility for seeing and avoiding obstacles rests with captains of civilian and military aircraft. Under the UK Standardised Rules of the Air Regulation (CAA, 2024) helicopters (like all aircraft) are required to avoid all structures, such as WTGs, by a minimum distance of 500 ft.
101. Military low flying and SAR and other offshore helicopter operations are deemed to be low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.8.2.1.2 Magnitude of Impact

102. As detailed in **Table 13.10**, potential impacts on low flying aircraft in the vicinity of the Bellrock WFDA will be mitigated through the development of an LMP in agreement with key aviation stakeholders, and through the provision of the positions and heights of structures to the CAA, MOD, and DGC to enable appropriate marking on aeronautical charts. The LMP will cover the lighting and marking of maintenance equipment such as tall cranes and HLVs. An **Outline LMP** is provided in **Volume V**.
103. Lighting of WTGs will consider MOD and SAR requirements, and the final WTG layout will be compatible with SAR helicopter operations. An ERCoP will be developed and implemented for each phase of the Bellrock Wind Farm Infrastructure.
104. Helicopters utilising HMRI that route over the Bellrock WFDA must remain at least 1,000 ft vertically clear of obstacles when flying IFR and 500 ft clear when flying VFR. Assuming a maximum blade tip height of 337 m (1,105.64 ft) above MSL, this equates to helicopter minimum altitudes of 2,200 ft (IFR) and 1,700 ft (VFR). HMRI are typically flown at altitudes between 1,500 ft and FL 60 (approximately 6,000 ft above MSL); however, helicopters may occasionally be required to operate below 1,500 ft to avoid icing conditions. Under these conditions,

helicopters with limited icing capability may be unable to fly over the Bellrock WFDA, restricting the available HMRI and requiring them to fly an extended route to their destination.

105. CAP 764 (CAA, 2025) states that HMRI are essentially used by ATS providers and helicopter operations for flight planning and management purposes although in most cases operationally helicopter operators will be provided with direct routings. HMRI have no lateral dimensions. Where helicopters are required to operate below 1,500 ft, pilots are often asked to follow HMRI to enable procedural separation if the aircraft is outside ATS communications and surveillance coverage. The Applicant has reached out to the central North Sea helicopter operators to determine whether the presence of the Bellrock Wind Farm Infrastructure may necessitate any mitigation. Initial feedback indicates that appropriate charting and lighting should address any concerns with respect to the Bellrock Wind Farm Infrastructure in isolation although a low-level transit route would be desirable (which also reflects MCA ERCOP requirements). The final layout of WTGs will take into account any such mitigation requirements and will also ensure the compatibility with possible SAR helicopter operations within the Bellrock WFDA.
106. The impact is considered to be of local spatial extent (i.e. limited to the aviation and radar study area), short to medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.8.2.1.3 Significance of Effect

107. The sensitivity of the receptor is deemed to be medium, and the magnitude of the impact is low. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

13.8.2.2 Impact O2: Increased Air Traffic in the Area in Relation to Wind Farm Activities

108. The O&M phase will likely see an increase in helicopter traffic above the current baseline level, engaged in works on the Bellrock Wind Farm Infrastructure. The O&M phase is anticipated to consist of a maximum of 986 round trips per year during the O&M phase (assuming 10% weather days and three trips per day).
109. The possible increase in air traffic associated with support activities brings with it a potential increased possibility of aircraft collision in the airspace around the Bellrock WFDA.

13.8.2.2.1 Sensitivity

110. Helicopter support operations and existing air traffic are deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.8.2.2.2 Magnitude of Impact

111. The predicted increase of helicopter movements during the O&M phase will be managed by the existing ATS infrastructure provided in accordance with national procedures, and pilots will be expected to operate in accordance with the regulatory requirements.

112. The impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.8.2.2.3 Significance of Effect

113. The sensitivity of the receptor is deemed to be medium, and the magnitude of the impact is low. The effect will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.8.2.3 Impact O3: Impact on Military and Civil PSR

114. The Bellrock WFDA is located within operational range of radar systems serving both civil and military agencies.
115. The TOPA produced by NATS (detailed in **Table 13.2**) determined that WTGs with the scoping tip height of 400 m above MSL may be within RLoS of NATS Perwinnes. Since the scoping stage, the maximum blade tip height considered for WTGs within the Bellrock WFDA has been reduced to 337 m above MSL. RLoS analysis detailed in **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)** and **Figure 13.3 (Volume III)** shows that WTGs with a maximum blade tip height of 337 m above MSL will not be within RLoS of NATS Perwinnes. This modelling was presented to NATS in which they agreed with the results via email correspondence (6 November 2025). NATS also advised that the Bellrock Wind Farm Infrastructure would *'not draw a NATS objection'*. The full response from NATS is listed in **Table 13.2**. The potential impact to NATS Perwinnes is therefore not considered further within this EIA.
116. RLoS analysis conducted within **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)** indicated that WTGs with a maximum blade tip height of 337 m above MSL within the northwest corner of the Bellrock WFDA (comprising of an area of 3.93 km²) will be within RLoS of military AD RRH Buchan (**Figure 13.2 (Volume III)**).

13.8.2.3.1 Sensitivity

117. Within their scoping response the MOD stated that they agree with the impact identified to RRH Buchan as highlighted in **Table 13.2**, which may result in an unacceptable degradation of the radar's operational capability.
118. PSRs are deemed to be of high vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be high.

13.8.2.3.2 Magnitude of Impact

119. When operational (i.e. with WTG blades rotating), WTGs have the potential to generate 'clutter' (or false targets) upon radar displays because current generation PSRs cannot easily differentiate between the moving blades of WTGs and aircraft. As a consequence, radar operators may be unable to distinguish between primary radar returns generated by WTGs and those generated by aircraft. This may compromise the ability of the MOD to undertake its AD role.

120. The impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be high.

13.8.2.3.3 Significance of Effect

121. The sensitivity of the receptor is deemed to be high and the magnitude of the impact is high. The effect will therefore be of **major adverse significance**, which is **significant** in EIA terms.

13.8.2.3.4 Secondary Mitigation

122. As discussed above, WTG Type 2 (with an equivalent tip height of 337 m above MSL) may be detected in a small section on the northwest corner of the Bellrock WFDA (comprising of an area of 3.93 km²). RLoS modelling shows that WTGs with a tip height of 318 m above HAT (i.e. an equivalent tip height of 320 m above MSL) and below, will not be within RLoS of RRH Buchan in this area.
123. As part of the detailed design of the Wind Farm Infrastructure undertaken post consent, should the RLoS impact on RRH Buchan require mitigation, the Applicant would not position WTGs with an equivalent tip height of 320 m above MSL within the RRH Buchan RLoS shown in **Figure 13.2** and discussed in **Appendix 13.1 (Volume IV)**. In the event that DIO consider that a materially larger area of the Bellrock WFDA presents RLoS impact on RRH Buchan, the Applicant will consider mitigating the impact through new AD infrastructure procured under Programme NJORD, with the cost of such Programme NJORD deployment being borne by the UK Government³.
124. Once mitigation solutions are implemented (if required), the sensitivity of the receptor is deemed to be high, and the magnitude of the impact is negligible, and the sensitivity of the receptor is high. The effects will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.8.3 Potential Impacts During Decommissioning

13.8.3.1 Impact D1: Increased Air Traffic in the Area in Relation to Wind Farm Activities

125. The decommissioning phase will likely see an increase in air traffic to support the dismantling of WTGs and associated infrastructure, with a maximum of 816 helicopter round trips per year.
126. The possible increase in air traffic associated with support activities brings with it a potential increased possibility of aircraft collision in the airspace around the Bellrock WFDA.

³ The Clean Energy 2030 action plan and National Policy Statement (NSP) for Energy (EN) 1 (2025) states that the full costs of the long-term radar mitigation solutions identified by Programme NJORD will be funded via an alternative route delivered by the UK Government, and therefore the associated funding requirement is removed from offshore wind developers.

13.8.3.1.1 Sensitivity

127. Helicopter support operations and existing air traffic are deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.8.3.1.2 Magnitude of Impact

128. The predicted increase of helicopter movements during the decommissioning phase will be managed by the existing ATS infrastructure provided in accordance with national procedures, and pilots will be expected to operate in accordance with the regulatory requirements.
129. The impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.8.3.1.3 Significance of Effect

130. The sensitivity of the receptor is deemed to be medium, and the magnitude of the impact is low. The effect is therefore considered to be of **minor adverse significance**, which is **not significant** in EIA terms.

13.9 Cumulative Effects Assessment

13.9.1 Screening of Potential Cumulative Impacts

131. Potential impacts from the Bellrock WFDA alone assessment are brought forward into the CEA. Some potential impacts considered for the Bellrock WFDA alone assessment may be specific to a particular phase of development (e.g. construction, O&M or decommissioning). The potential for cumulative effects with other plans or projects requires spatial and/or temporal overlap with the Bellrock Wind Farm Infrastructure during the relevant phases of development.
132. Therefore, impacts associated with a certain phase may be screened out from further consideration where no projects or plans have been identified that have the potential for cumulative effects during the same temporal period and/or across the same spatial extent. All impacts considered in the Bellrock WFDA alone assessment (**Section 13.8**) were initially brought forward for CEA impact pathway screening (**Table 13.11**). Impact screening considered the Zone of Influence of the impacts and the plans and projects identified in **Table 13.12**.
133. Impacts with no rationale for cumulative effects i.e. those assessed as no change or where impacts were highly spatially and/or temporally constrained, and therefore would not contribute to a cumulative effect, were screened out.

Table 13.11: Potential Cumulative Impacts (Aviation and Radar)

Potential Impact	Bellrock WFDA-alone Residual Effect	Potential for Cumulative Effects	Rationale
Construction Phase			
Impact C1: Creation of an Aviation Obstacle Environment	Minor significance	Yes	WTGs and tall crane vessels associated with the other developments create aviation obstacles, restricting the available airspace.
Impact C2: Increased air traffic in the area in relation to wind farm activities	Minor significance	Yes	Air traffic associated with other developments have the potential to cumulatively increase the possibility of aircraft collision.
Impact C3: Impact on civil and military PSRs	Minor significance	Yes	Offshore wind farms could impact PSRs over a larger area.
Operation and Maintenance Phase			
Impact O1: Creation of an aviation obstacle environment	Minor significance	Yes	WTGs and infrastructure associated with the other developments create aviation obstacles, restricting the available airspace.
Impact O2: Increased air traffic in the area in relation to wind farm activities	Minor significance	Yes	Air traffic associated with other developments have the potential to cumulatively increase the possibility of aircraft collision.
Impact O3: Impact on civil and military PSRs	Minor significance	Yes	Offshore wind farms could impact PSRs over a larger area.
Decommissioning			
Impact D1: Increased air traffic in the area in relation to wind farm activities	Minor significance	Yes	Air traffic associated with other developments have the potential to cumulatively increase the possibility of aircraft collision.

13.9.2 Screening of Other Plans, Projects and Activities

134. Potential cumulative plans and projects were identified and screened in **Appendix 5.3: Cumulative Effects Assessment Long List of Projects (Volume IV)**. For this CEA, a 100 km distance is used to identify possible plans or projects as this distance encompasses the zone of influence for all relevant Bellrock WFDA impacts as well as incremental changes over the wider relevant area. The plans and projects which have been subsequently scoped into the CEA for aviation and radar are outlined in **Table 13.12**. Given that there is no potential pathway for impact to aviation and radar due to the proposed Bellrock Onshore Transmission Infrastructure, the Bellrock OnTDA has not been considered further within the CEA. The Proposed Bellrock OfTDA however, remains as part of the Tier 1 assessment, due to a potential receptor impact pathway.

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Table 13.12: Other Plans and Projects considered within the Cumulative Effects Assessment for Aviation and Radar

Plan or Project	Type of Plan or Project	Status at the Time of CEA (i.e. Application Submitted, Consented, etc.)	Closest Distance from Boundary of Bellrock WFDA (km)	Expected Date of Construction (if Applicable)	Expected Date of Operation (if Applicable)	Data Confidence (High, Medium, Low)	Rationale
Ossian	Offshore wind farm	In Planning (Application submitted)	9	2031 to 2038	Unknown	High - Third party project details published in the public domain and confirmed as being 'accurate' by CES	Within 100 km of the Bellrock WFDA
Cedar	Offshore wind farm	Pre-planning	21	Unknown	Unknown	Low – Lack of data availability	Within 100 km of the Bellrock WFDA
Campion Wind ^[1]	Offshore wind farm	In Planning (Scoping Submitted)	24	Unknown	Unknown	Medium - 4C Offshore Map may be subject to update delays	Within 100 km of the Bellrock WFDA
Morven Offshore (North and South)	Offshore wind farm	In Planning (Scoping Submitted)	35	2028 to 2030	2031	Medium - 4C Offshore map may be subject to update delays	Within 100 km of the Bellrock WFDA
Muir Mhòr	Offshore wind farm	In Planning (Application submitted)	52	2028 to 2031	2032	Medium - 4C Offshore map may be subject to update delays	Within 100 km of the Bellrock WFDA
Cenos	Offshore wind farm	In Planning (Application submitted)	61	2030 to 2034	2035	High - Third party project details published in the public domain and confirmed as being 'accurate' by CES	Within 100 km of the Bellrock WFDA

Plan or Project	Type of Plan or Project	Status at the Time of CEA (i.e. Application Submitted, Consented, etc.)	Closest Distance from Boundary of Bellrock WFDA (km)	Expected Date of Construction (if Applicable)	Expected Date of Operation (if Applicable)	Data Confidence (High, Medium, Low)	Rationale
Bowdun Offshore Wind Farm	Offshore wind farm	In Planning (Scoping submitted)	62	2031 to 2032	2033	High - Third party project details published in the public domain and confirmed as being 'accurate' by CES	Within 100 km of the Bellrock WFDA
Aspen	Offshore wind farm	In Planning (Application submitted)	81	2028 to 2030	2031	High - Third party project details published in the public domain and confirmed as being 'accurate' by CES	Within 100 km of the Bellrock WFDA
Seagreen Phase 1	Offshore wind farm	Operational	86	N/A	N/A	High - Third party project details published in the public domain and confirmed as being 'accurate' by CES	Within 100 km of the Bellrock WFDA
Berwick Bank	Offshore wind farm	Consented/Pre-construction	86	2028 to 2031	2032	High - Third party project details published in the public domain and confirmed as being 'accurate' by CES	Within 100 km of the Bellrock WFDA
Flora	Offshore wind farm	Pre-planning	88	Unknown	Unknown	Low – Lack of data availability	Within 100 km of the Bellrock WFDA
Seagreen Phase 1A	Offshore wind farm	Consented/Pre-construction	96	2029 to 2032	2033	High - Third party project details published in the public domain and confirmed as being 'accurate' by CES	Within 100 km of the Bellrock WFDA

Plan or Project	Type of Plan or Project	Status at the Time of CEA (i.e. Application Submitted, Consented, etc.)	Closest Distance from Boundary of Bellrock WFDA (km)	Expected Date of Construction (if Applicable)	Expected Date of Operation (if Applicable)	Data Confidence (High, Medium, Low)	Rationale
Salamander	Offshore wind farm	Consented/Pre-construction	98	2027 to 2029	2030	High - Third party project details published in the public domain and confirmed as being 'accurate' by CES	Within 100 km of the Bellrock WFDA
Culzean	Offshore wind farm	Pre-Operational	100	N/A	N/A	Medium - 4C Offshore Map may be subject to update delays	Within 100 km of the Bellrock WFDA

Notes:

^[1] In November 2025, Shell returned the Option to Lease for the CampionWind project to CES. In agreement with MD-LOT, CampionWind is included in this CEA screening process.

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13.9.3 Assessment of Cumulative Effects

13.9.3.1 Potential Cumulative Effects During Construction

13.9.3.1.1 *Impact C1: Creation of an Aviation Obstacle Environment*

135. Construction of the Bellrock Wind Farm Infrastructure may involve tall HLVs to assist in the installation of infrastructure above sea level after the towing of FOU's to the Bellrock WFDA. From a starting point of no Wind Farm Infrastructure within the Bellrock WFDA, to the Wind Farm Infrastructure outlined in **Table 13.9** being installed over the seven-year construction period (plus one year site preparation works). Together with other projects and operational wind farms, this may pose a physical obstruction to low flying aircraft, increasing the risk of collision or requiring aircraft to fly extended routes to avoid obstacles.
136. Specifically, permanent or temporary obstacles may increase collision risk for:
- General military low flying training operations;
 - Helicopter traffic utilising HMRI's 113 and 116; and
 - Other offshore fixed wing and helicopter operations, including those undertaking SAR operations over the North Sea.

13.9.3.1.1.1 *Sensitivity*

137. Embedded mitigation measures with respect to notification, charting, marking and lighting will make all pilots aware of the addition of infrastructure to the Bellrock WFDA, and it is reasonably assumed that pilots will comply with aviation regulatory requirements. The ultimate responsibility for seeing and avoiding obstacles rests with captains of civilian and military aircraft. Under the UK Standardised Rules of the Air Regulation (CAA, 2024) helicopters (like all aircraft) are required to avoid all structures, such as WTGs, by a minimum distance of 500 ft.
138. Military low flying and SAR and other offshore helicopter operations are deemed to be low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.9.3.1.1.2 *Magnitude of Cumulative Effect*

139. As detailed in **Table 13.10**, potential impacts on low flying aircraft in the vicinity of the Bellrock WFDA will be mitigated through the development of an LMP in agreement with key aviation stakeholders, and through the provision of the positions and heights of structures to the CAA, MOD, and DGC to enable appropriate marking on aeronautical charts. The LMP will cover the lighting and marking of construction equipment such as tall cranes. An Outline LMP is provided in **Volume V**.
140. Lighting of WTGs will consider MOD and SAR requirements, and the final WTG layout will be compatible with SAR helicopter operations. An ERCoP will be developed and implemented for each phase of the Bellrock Wind Farm Infrastructure.

141. Operational wind farm projects will already have suitable aviation lighting and will be marked on relevant aeronautical charts to make pilots aware of their presence. Other proposed projects will have similar embedded mitigation measures as the Bellrock Wind Farm Infrastructure.
142. The cumulative impact is considered to be of local spatial extent (i.e. limited to the aviation and radar study area), short to medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.9.3.1.1.3 Significance of Cumulative Effect

143. The sensitivity of the receptor is deemed to be medium, and the magnitude of the cumulative impact is low. The cumulative effect will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.9.3.1.2 Impact C2: Increased Air Traffic in the Area in Relation to Wind Farm Activities

144. The construction of the Wind Infrastructure will see a maximum of 816 helicopter round trips per year during the construction period.
145. This possible increase in air traffic associated with the construction phase combined with a possible increase in air traffic for other projects brings with it a potential increased possibility of aircraft collision in airspace around the Bellrock WFDA.

13.9.3.1.2.1 Sensitivity

146. Helicopter support operations and existing air traffic are deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.9.3.1.2.2 Magnitude of Cumulative Effect

147. The predicted helicopter movements during the construction phase will be managed by existing ATS infrastructure provided in accordance with national procedures, and pilots will be expected to operate in accordance with regulatory requirements.
148. The cumulative impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), short to medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.9.3.1.2.3 Significance of Cumulative Effect

149. The sensitivity of the receptor is deemed to be medium, and the magnitude of the cumulative impact is low. The cumulative effect will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.9.3.1.3 Impact C3: Impact on Military and Civil PSR

150. As WTGs are installed during the construction phase, there will be an overlap with the operation and maintenance phase in which some WTGs will become operational.

151. The Bellrock WFDA is located within operational range of radar systems serving both civil and military agencies.
152. RLoS analysis conducted within **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)** indicated that WTGs with a maximum blade tip height of 337 m above MSL within the northwest corner of the Bellrock WFDA will be within RLoS of military AD RRH Buchan.

13.9.3.1.3.1 Sensitivity

153. Within their scoping response the MOD stated that they agree with the impact identified to RRH Buchan as highlighted in **Table 13.2**, which may result in an unacceptable degradation of the radar's operational capability.
154. PSRs are deemed to be of high vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be high.

13.9.3.1.3.2 Magnitude of Cumulative Effect

155. Radar detection from multiple offshore wind developments may result in a substantial increase in clutter being generated over a larger area on radar displays. This may therefore compromise the ability of the MOD to undertake its AD role.
156. The cumulative impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be high.

13.9.3.1.3.3 Significance of Cumulative Effect

157. The sensitivity of the receptor is deemed to be high, and the magnitude of the cumulative impact is high. The cumulative effect will therefore be of **major adverse significance**, which is significant in EIA terms.

13.9.3.1.3.4 Secondary Mitigation

158. It is reasonably assumed that for existing offshore wind developments within RLoS of MOD radars that any required mitigation solutions have been implemented. Further operational offshore wind developments, including the Bellrock Project, must have necessary radar mitigation solutions in place before becoming operational (see **Section 13.8.2.3.4**). With mitigation solutions implemented, the magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is high. The cumulative effect will, therefore, be of **minor adverse significance** in EIA terms.
159. Once mitigation solutions are implemented, the sensitivity of the receptor is deemed to be high, and the magnitude of the impact is negligible, and the sensitivity of the receptor is high. The effects will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.9.3.2 Potential Cumulative Effects during Operation and Maintenance

13.9.3.2.1 Impact O1: Creation of an Aviation Obstacle Environment

160. During the O&M phase, the Wind Farm Infrastructure outlined in **Table 13.9** will be present within the Bellrock WFDA. This infrastructure, together with the installation of WTGs associated

with other projects and other operational wind farms may pose a physical obstruction to aircraft utilising the airspace in the vicinity of the Bellrock WFDA and other projects. Tall cranes and HLVs used to assist in the maintenance of Wind Farm Infrastructure will be present during the O&M phase.

161. Specifically, obstacles within the Bellrock WFDA may increase collision risk for:
- General military low flying training and operations;
 - Helicopters utilising HMRI 113 and 116; and
 - Offshore fixed wing and helicopter operations, including those undertaking SAR operations over the North Sea.

13.9.3.2.1.1 Sensitivity

162. Embedded mitigation measures with respect to notification, charting, marking and lighting will make all pilots aware of the addition of infrastructure to the Bellrock WFDA, and it is reasonably assumed that pilots will comply with aviation regulatory requirements. The ultimate responsibility for seeing and avoiding obstacles rests with captains of civilian and military aircraft. Under the UK Standardised Rules of the Air Regulation (CAA, 2024) helicopters (like all aircraft) are required to avoid all structures, such as WTGs, by a minimum distance of 500 ft.
163. Military low flying and SAR and other offshore helicopter operations are deemed to be low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.9.3.2.1.2 Magnitude of Cumulative Effect

164. As detailed in **Table 13.10**, potential impacts on low flying aircraft in the vicinity of the Bellrock WFDA will be mitigated through the development of an LMP in agreement with key aviation stakeholders, and through the provision of the positions and heights of structures to the CAA, MOD, and DGC to enable appropriate marking on aeronautical charts. The LMP will cover the lighting and marking of maintenance equipment such as tall cranes and HLVs. An **Outline LMP** is provided in **Volume V**.
165. Lighting of WTGs will consider MOD and SAR requirements, and the final WTG layout will be compatible with SAR helicopter operations. An ERCoP will be developed and implemented for each phase of the Bellrock Wind Farm Infrastructure.
166. Operational wind farm projects will already have suitable aviation lighting and are marked on relevant aeronautical charts to make pilots aware of their presence. Other proposed projects will have similar embedded mitigation measures as the Bellrock Wind Farm Infrastructure.
167. The cumulative impact is considered to be of local spatial extent (i.e. limited to the aviation and radar study area), short to medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.9.3.2.1.3 *Significance of Cumulative Effect*

168. The sensitivity of the receptor is deemed to be medium, and the magnitude of the cumulative impact is low. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

13.9.3.2.2 *Impact O2: Increased Air Traffic in the Area in Relation to Wind Farm Activities*

169. The O&M phase will likely see an increase in helicopter traffic above the current baseline level engaged in works on the Bellrock Wind Farm Infrastructure. The O&M phase is anticipated to consist of a maximum of 986 round trips per year during the O&M phase (assuming 10% weather days and three trips per day).
170. The possible increase in air traffic associated with support activities combined with a possible increase in air traffic for other projects brings with it a potential increased possibility of aircraft collision in the airspace around the Bellrock WFDA.

13.9.3.2.2.1 *Sensitivity*

171. Helicopter support operations and existing air traffic are deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.9.3.2.2.2 *Magnitude of Cumulative Effect*

172. The predicted increase of helicopter movements during the O&M phase will be managed by the existing ATS infrastructure provided in accordance with national procedures, and pilots will be expected to operate in accordance with the regulatory requirements.
173. The cumulative impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.9.3.2.2.3 *Significance of Cumulative Effect*

174. The sensitivity of the receptor is deemed to be medium, and the magnitude of the impact is low. The cumulative effect will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.9.3.2.3 *Impact O3: Impact on Military and Civil PSR*

175. The Bellrock WFDA is located within operational range of radar systems serving both civil and military agencies.
176. RLoS analysis conducted within **Appendix 13.1: Airspace Analysis and Radar Modelling (Volume IV)** indicated that WTGs with a maximum blade tip height of 337 m above MSL within the northwest corner of the Bellrock WFDA will be within RLoS of military AD RRH Buchan.

13.9.3.2.3.1 Sensitivity

177. Within their scoping response the MOD stated that they agree with the impact identified to RRH Buchan as highlighted in **Table 13.2**, which may result in an unacceptable degradation of the radar's operational capability.
178. PSRs are deemed to be of high vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be high.

13.9.3.2.3.2 Magnitude of Cumulative Effect

179. Radar detection from multiple offshore wind developments may result in a substantial increase in clutter being generated over a larger area on radar displays. This may therefore compromise the ability of the MOD to undertake its AD role.
180. The cumulative impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), medium term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be high.

13.9.3.2.3.3 Significance of Cumulative Effect

181. The sensitivity of the receptor is deemed to be high, and the magnitude of the cumulative impact is high. The cumulative effect will therefore be of **major adverse significance**, which is **significant** in EIA terms.

13.9.3.2.3.4 Secondary Mitigation

182. It is reasonably assumed that for existing offshore wind developments within RLoS of MOD radars that any required mitigation solutions have been implemented. Further operational offshore wind developments, including the Bellrock Project, must have necessary radar mitigation solutions in place before becoming operational (**Section 13.8.2.3.4**). With mitigation solutions implemented, the magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is high. The cumulative effect will, therefore, be of **minor adverse significance** in EIA terms.
183. Once mitigation solutions are implemented, the sensitivity of the receptor is deemed to be high, and the magnitude of the impact is negligible, and the sensitivity of the receptor is high. The effects will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.9.3.3 Potential Cumulative Impacts During Decommissioning

13.9.3.3.1 Impact D1: Increased Air Traffic in the Area in Relation to Wind Farm Activities

184. The decommissioning phase will likely see an increase in air traffic to support the dismantling of Wind Farm Infrastructure.
185. The possible increase in air traffic associated with support activities combined with increase in air traffic for other wind farms brings with it a potential increased possibility of aircraft collision in the airspace around the Bellrock WFDA and other projects.

13.9.3.3.1.1 Sensitivity

186. Helicopter support operations and existing air traffic are deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore considered to be medium.

13.9.3.3.1.2 Magnitude of Cumulative Effect

187. The predicted increase of helicopter movements during the decommissioning phase will be managed by the existing ATS infrastructure provided in accordance with national procedures, and pilots will be expected to operate in accordance with the regulatory requirements.

188. The cumulative impact is predicted to be of local spatial extent (i.e. limited to the aviation and radar study area), medium term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be low.

13.9.3.3.1.3 Significance of Cumulative Effect

189. The sensitivity of the receptor is deemed to be medium, and the magnitude of the impact is low. The cumulative effect will therefore be of **minor adverse significance**, which is **not significant** in EIA terms.

13.10 Inter-related and Interacting Impacts

13.10.1 Inter-relationships

190. **Table 13.13** below provides a summary of the key inter-relationships between aviation and radar and other technical chapters and indicates where those issues have been addressed in the relevant chapters.

Table 13.13: Key Inter-relationships for Aviation and Radar

Topic and Description	Related Chapter(s)	Where Addressed in This Chapter	Rationale
Construction			
C1: Creation of an aviation obstacle environment	Chapter 12: Shipping and Navigation (Volume II). Chapter 14: Marine Infrastructure and Other Users (Volume II). Chapter 19: Major Accidents and Other Users (Volume II).	Marking and lighting would be in accordance with both aviation and maritime requirements as stated in Table 13.10 .	Aviation lighting could be mistaken for maritime lighting.
Operation and Maintenance			
O1: Creation of an aviation obstacle environment	Chapter 12: Shipping and Navigation (Volume II). Chapter 14: Marine Infrastructure and Other Users (Volume II). Chapter 19: Major Accidents and Other Users (Volume II).	Marking and lighting would be in accordance with both aviation and maritime requirements as stated in Table 13.10 .	Aviation lighting could be mistaken for maritime lighting.

13.10.2 Interactions

191. The impacts identified and assessed in this Chapter have the potential to interact with each other. Areas of potential interaction between impacts are presented in **Table 13.14**, **Table 13.15** and **Table 13.16** below. The impacts are assessed relative to each development phase (i.e. construction, O&M or decommissioning) to see if (for example) multiple construction impacts affecting the same receptor could increase the magnitude of impact upon that receptor.
192. A subsequent lifetime assessment has been undertaken which considers the impact interactions identified and the potential for impacts to effect receptors relevant to this Chapter across all development phases (**Table 13.17**).

Table 13.14: Potential Interaction Between Impacts - Construction

Potential Interaction Between Construction Impacts		
Impact	C1: Creation of an Aviation Obstacle Environment	C2: Increased Air Traffic in the Area Related to Wind Farm Activities
C1: Creation of an Aviation Obstacle Environment		No
C2: Increased Air Traffic in the Area Related to Wind Farm Activities	No	

Table 13.15: Potential Interaction Between Impacts - Operation and Maintenance

Potential Interaction Between O&M Impacts			
Impact	O1: Creation of an Aviation Obstacle Environment	O2: Increased Air Traffic in the Area Related to Wind Farm Activities	O3: Impact on Military and Civil PSR
O1: Creation of an Aviation Obstacle Environment		No	No
O2: Increased Air Traffic in the Area Related to Wind Farm Activities	No		No
O3: Impact on Military and Civil PSR	No	No	

Table 13.16: Potential Interaction Between Impacts - Decommissioning

Potential Interaction Between Decommissioning Impacts	
Impact	D1: Increased Air Traffic in the Area Related to Wind Farm Activities
D1: Increased Air Traffic in the Area Related to Wind Farm Activities	

Table 13.17: Potential Interactions Between Impacts - Phase and Lifetime Assessment

Highest Significance of Effect Level					
Receptor	Construction	O&M	Decommissioning	Phase Assessment	Lifetime Assessment
<p>General military low flying training operations.</p> <p>Helicopter traffic utilising HMRIs 113 and 116.</p> <p>Other offshore fixed wing and helicopter operations, including those undertaking SAR operations over the North Sea.</p>	Minor adverse	Minor adverse	Minor adverse	No greater than individually assessed impact.	<p>No greater than individually assessed impact.</p> <p>The spatial extent of the aviation obstacle environment would gradually increase during the construction phase as Wind Farm Infrastructure is installed within the Bellrock WFDA. The obstacle environment would then remain constant with exception of cranes and HLVs used in maintenance until the decommissioning phase. The impacts during the different phases are not anticipated to interact in such a way as to generate an effect of greater significance than those assessed for individual phases.</p>
<p>Helicopter traffic engaged in works on the Project.</p>	Minor adverse	Minor adverse	N/A	<p>No greater than individually assessed impact.</p> <p>There is potential interaction between impacts identified in the O&M phase; however, all potential effects are not significant and are localised in nature. Embedded mitigation measures, the existing ATS infrastructure, and pilot compliance with regulatory requirements would reduce the potential for interaction of impacts; therefore, it is anticipated that the combined effect on airspace users would not be of greater significance than when impacts are assessed in isolation.</p>	N/A

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13.11 Summary

193. **Table 13.18** presents a summary of the assessment of potential effects on aviation and radar during the construction, O&M and decommissioning phases of the Bellrock Wind Farm Infrastructure.
194. No significant effects are expected to occur for aviation and radar receptors within the aviation and radar study area, either alone or in combination.

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Table 13.18: Summary of Potential Effects for Aviation and Radar

Potential Impact	Receptor(s)	Sensitivity	Magnitude of Impact	Significance of Effect	Secondary Mitigation	Residual Significance of Effect	Cumulative Residual Significance of Effect
Construction							
C1: Creation of an Aviation Obstacle Environment	<ul style="list-style-type: none"> ▪ General military low flying training operations; ▪ Helicopter traffic utilising HMRI 113 and 116; and ▪ Other offshore fixed wing and helicopter operations, including those undertaking SAR operations over the North Sea. 	Medium	Low	Minor adverse	N/A	Minor adverse significance	Not significant
C2: Increased Air Traffic in the Area in Relation to Wind Farm Activities	<ul style="list-style-type: none"> ▪ General military low flying training operations; ▪ Helicopter traffic utilising HMRI 113 and 116; and ▪ Other offshore fixed wing and helicopter operations, including those undertaking SAR operations over the North Sea. 	Medium	Low	Minor adverse	N/A	Minor adverse significance	Not significant
C3: Impact on Civil and Military PSRs	<ul style="list-style-type: none"> ▪ NATS Perwinnes; and ▪ RRH Buchan. 	High	High	Major adverse	NATS has confirmed Perwinnes will not have RLoS of WTGs within the Bellrock WFDA.	Minor adverse significance	Not significant

Potential Impact	Receptor(s)	Sensitivity	Magnitude of Impact	Significance of Effect	Secondary Mitigation	Residual Significance of Effect	Cumulative Residual Significance of Effect
					<p>As part of the detailed design of the Wind Farm Infrastructure undertaken post consent, should the RLoS impact on RRH Buchan require mitigation, the Applicant would not position WTGs with an equivalent tip height of 320 m above MSL within the RRH Buchan RLoS.</p> <p>In the event that DIO consider that a materially larger area of the Bellrock WFDA presents RLoS impact on RRH Buchan, the Applicant will consider mitigating the impact through new AD infrastructure procured under Programme NJORD, with the cost of such Programme NJORD deployment being borne by the UK Government.</p>		

Potential Impact	Receptor(s)	Sensitivity	Magnitude of Impact	Significance of Effect	Secondary Mitigation	Residual Significance of Effect	Cumulative Residual Significance of Effect
Operation and Maintenance							
O1: Creation of an Aviation Obstacle Environment	<ul style="list-style-type: none"> ▪ General military low flying training operations; ▪ Helicopter traffic utilising HMRI 113 and 116; and ▪ Other offshore fixed wing and helicopter operations, including those undertaking SAR operations over the North Sea. 	Medium	Low	Minor adverse	N/A	Minor adverse significance	Not significant
O2: Increased Air Traffic in the Area in Relation to Wind Farm Activities	<ul style="list-style-type: none"> ▪ General military low flying training operations; ▪ Helicopter traffic utilising HMRI 113 and 116; and ▪ Other offshore fixed wing and helicopter operations, including those undertaking SAR operations over the North Sea. 	Medium	Low	Minor adverse	N/A	Minor adverse significance	Not significant

Potential Impact	Receptor(s)	Sensitivity	Magnitude of Impact	Significance of Effect	Secondary Mitigation	Residual Significance of Effect	Cumulative Residual Significance of Effect
O3: Impact on Civil and Military PSRs	<ul style="list-style-type: none"> ▪ NATS Perwinnes; and ▪ RRH Buchan. 	High	High	Major adverse	<p>NATS has confirmed Perwinnes will not have RLoS of WTGs within the Bellrock WFDA.</p> <p>As part of the detailed design of the Wind Farm Infrastructure undertaken post consent, should the RLoS impact on RRH Buchan require mitigation, the Applicant would not position WTGs with an equivalent tip height of 320 m above MSL within the RRH Buchan RLoS, shown on Figure 13.2 in (Volume III). In the event that DIO consider that a materially larger area of the Bellrock WFDA presents RLoS impact on RRH Buchan, the Applicant will consider mitigating the impact through new AD infrastructure procured under Programme NJORD, with the cost of such Programme NJORD deployment being borne by the UK Government.</p>	Minor adverse significance	Not significant

Potential Impact	Receptor(s)	Sensitivity	Magnitude of Impact	Significance of Effect	Secondary Mitigation	Residual Significance of Effect	Cumulative Residual Significance of Effect
Decommissioning							
D1: Increased Air Traffic in the Area in Relation to Wind Farm Activities	<ul style="list-style-type: none"> ▪ General military low flying training operations; ▪ Helicopter traffic utilising HMRIs 113 and 116; and ▪ Other offshore fixed wing helicopter operations, including those undertaking SAR operations over the North Sea. 	Medium	Low	Minor adverse	N/A	Minor adverse significance	Not significant

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