Bowdun Offshore Wind Farm, Offshore EIA Report

Volume 3, Technical Appendix 15.1: Aviation and Radar Technical Report

TWP-BOW-RPS-OFE-RPT-00053 | April 2026

Contents

List of Tables

List of Figures

Glossary

Defined Term	Definition
Airfield Reference Point	The designated geographical location of an aerodrome, usually located near the geometric centre of the landing area.
Applicant (the)	Bowdun Offshore Wind Farm Limited (BOWFL).
Array Area	The Array Area is the area in which the Offshore Generation Assets will be located.
Civil Aviation Publication (CAP)	Guidance material and policies for the aviation industry, ensuring the safe conduct of aircraft operations. CAPs include detailed information on various aspects of aviation, such as procedures, standards, best practices, and regulatory requirements. They address both technical and operational matters.
Danger Area	Airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.
Environmental Impact Assessment (EIA)	Process for the assessment of likely significant environmental effects of a project on the physical, biological, and human environment during construction, Operation and Maintenance (O&M) and decommissioning.
Export Cable Corridor	The area of seabed seaward of Mean High Water Springs (MHWS) which connects the Array Area with the Landfall area within which the Offshore Export Cables will be installed.
Helicopter Main Route Indicator (HMRI)	Used over the North Sea and in Morecambe Bay to provide a network of offshore routes utilised by civilian helicopters operating between the UK mainland and offshore installations.
Icing Level	The level at which the air contains droplets of supercooled liquid water which results in icing conditions where aircraft lift characteristics can be adversely affected.
Instrument Flight Procedure (IFP)	A published procedure used by aircraft flying in accordance with the instrument flight rules which is designed to achieve and maintain an acceptable level of safety in operations and includes an instrument approach procedure and a standard instrument departure.
Intertidal Area	The area between MHWS and Mean Low Water Springs.
Landfall	The area in which the Offshore Export Cables make landfall and is also the transitional area between the Offshore Transmission Assets and the Onshore Transmission Assets. Located in the Intertidal Area at Benholm.
Minimum Sector Altitude	The lowest altitude providing a minimum of 1,000 feet (300 m) clearance over all terrain and obstacles within a 25 nm (46 km) radius of an airport.
Offshore Export Cables	Subsea cables used to transmit electricity generated offshore by the Wind Turbines from the OSPs to shore. The Transition Joint Bay is the location where the Offshore Export Cables terminate, and the onshore cabling begins.
Offshore Scoping Report	The report that presents the findings of the EIA scoping process undertaken for the Proposed Development with the purpose of obtaining a Scoping Opinion. The Offshore Scoping Report defines what is intended to be assessed and reported as part of the EIA.

Defined Term	Definition
Offshore Substation Platform(s) (OSPs)	OSPs comprise the support structure, topside and electrical components used for collecting and/or converting electricity generated by the Wind Turbines for transmission by the Offshore Export Cables.
Operation and Maintenance (O&M)	The phase of the Proposed Development following completion of construction. This phase of development includes routine inspections, repairs and replacement of infrastructure and equipment (including Interconnector Cables and IACs), Scour Protection replenishment or replacement, major component replacement, painting and/or other coating works, removal of marine growth, and replacement of access ladders.
Option to Lease Agreement (OLA)	An agreement between CES and a developer, permitting the future development of offshore wind within an agreed area.
Plan Option Area (POA)	A location identified in the SMP as a preferred area for commercial scale offshore wind development.
Primary Surveillance Radar (PSR)	A radar system that measures the bearing and distance of targets using the detected reflections of radio signals.
Project (the)	An overarching term for the Bowdun Offshore Wind Farm (Bowdun OWF) comprising the offshore and onshore infrastructure required to generate and transmit electricity from the Array Area to the onshore Grid Connection Point. The Project includes the Offshore Generation Assets, the Offshore Transmission Assets and the Onshore Transmission Assets.
Proposed Development	Term used to define the Offshore Infrastructure associated with the Project seaward of MHWS for which consent is being sought. Further details of the parameters are included in Volume 1, Chapter 3: Project Description.
Sectoral Marine Plan (SMP)	A plan developed by the Scottish Government which provide the strategically planned spatial footprint for offshore wind development in Scotland.
Scoping Opinion	A document produced by MD-LOT which is issued in response to submission and review of the Offshore Scoping Report. The Scoping Opinion is supported with feedback and advice from consultees, which details what is expected to be included in the Offshore EIA Report and what can be scoped out of the EIA process.
Study Area	For each environmental topic, the baseline environment will be characterised, and the potential environmental impacts will be described within a topic-specific study area. Specific study areas are defined for each topic and are based on the maximum spatial extent across which potential impacts of the Project may be experienced by the relevant receptors (i.e. Zone of Influence).
Visual Flight Rules (VFR)	The set of rules that govern aircraft flying clear of cloud and in good visibility.
Wind Turbines	Structures comprising of a tubular tower, rotor blades, and a nacelle which houses the Wind Turbine generator.

Acronyms

Acronym	Definition
3-D NAIZs	3-Dimensional Non-Automatic Initiation Zones
AD	Air Defence
BOWFL	Bowdun Offshore Wind Farm Limited
APDO	Approved Procedure Design Organisation
ARP	Airfield Reference Point
ATC	Air Traffic Control
ATS	Air Traffic Services
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CNS	Communication, Navigation and Surveillance
EIA	Environmental Impact Assessment
ERCoP	Emergency Response Cooperation Plan
FL	Flight Level
HMRI	Helicopter Main Route Indicator
HVAC	High Voltage Alternating Current
IAC	Inter-Array Cable
IAIP	Integrated Aeronautical Information Package
IFP	Instrument Flight Procedure
LAT	Lowest Astronomical Tide
LMP	Lighting and Marking Plan
MCA	Maritime & Coastguard Agency
Mil AIP	Military Aeronautical Information Publication
MoD	Ministry of Defence
MRT	Multi-Radar Tracker
MSA	Minimum Sector Altitude
NATS	National Air Traffic Services
NAVAID	Navigational Aid
NERL	NATS En-Route Public Limited Company
OLA	Option Lease Agreement
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
OWIC	Offshore Wind Industry Council
O&M	Operation and Maintenance
PEXA	Practice and Exercise Area
POA	Plan Option Area
PSR	Primary Surveillance Radar
RLoS	Radar Line of Sight

Acronym	Definition
SAR	Search and Rescue
SMP	Sectoral Marine Plan
TMZ	Transponder Mandatory Zone
UK	United Kingdom
VFR	Visual Flight Rules

Table of Units

Units	Definition
ft	Feet
km	Kilometre
km²	Square kilometre
m	Metre
nm	Nautical mile
°	Degree

1 Introduction

1.1.1 This Aviation and Radar Technical Report identifies the key Aviation and Radar baseline conditions for the offshore elements of the Bowdun Offshore Wind Farm (OWF) Project (hereafter referred to as the Proposed Development). The Proposed Development covers the Option Lease Area (OLA) comprises of the Array Area, which is located in the E3 Plan Option Area (POA) detailed in the Scottish Sectoral Marine Plan (SMP) (Scottish Government, 2020), and the Export Cable Corridor. The Array Area is located 38 km from the Aberdeenshire coast at its closest point, covering an area of 187 km^2 (Figure 2.1). The Proposed Development will comprise Wind Turbines (fixed foundations), Inter-Array Cables (IACs), Offshore Substation Platforms (OSPs), Interconnector Cables, Offshore Export Cables and any necessary scour/cable protection. The Export Cable Corridor will include a maximum of three High Voltage Alternating Current (HVAC) Offshore Export Cables, each with a length of up to 70 km and will make Landfall at Benholm.

1.1.2 A detailed desktop study of existing resources available has been carried out within the defined Aviation and Radar Study Areas (as described in Section 2), and the identification of potential receptors has been reviewed. Effects on aviation safety often require the implementation of technical mitigation to ensure the continued safe operation of aircraft in the presence of a wind farm. The assessment of risks to aircraft is therefore one of technical analysis, supported by consultation, which seeks to identify whether the effect is likely to be 'acceptable' or 'not acceptable' to the providers of Air Traffic Services (ATS).

1.1.3 The information from this technical report informs the environmental baseline and the assessment of the likely significant environmental effects of the Proposed Development on aviation and radar receptors. This report accompanies the Environmental Impact Assessment (EIA) provided in Volume 2, Chapter 15: Aviation and Radar to support the consent application for the Proposed Development. This technical report is also informed by the following technical report:

- Volume 3, Technical Appendix 15.2: Instrument Flight Procedure Safeguarding Report Aberdeen Airport.

1.1.4 The aim of this Aviation and Radar Technical Report is to:

- characterise the baseline conditions in the vicinity of the Proposed Development;
- identify the relevant aviation stakeholders;
- identify risks associated with potential impact on receptors; and
- identify possible mitigation requirements.

2 Aviation and Radar Study Areas

2.1.1 Two study areas are defined for Aviation and Radar:

- Primary Aviation and Radar Study Area; and
- Secondary Aviation and Radar Study Area.

2.1.2 The Aviation and Radar Study Areas are shown in Figure 2.1 and are defined as follows:

- Primary Aviation and Radar Study Area:
  - The Primary Aviation and Radar Study Area is defined by a 9 nm (17 km) buffer around the Array Area in accordance with recommended consultation distances contained in Civil Aviation Publication (CAP) 764 (Civil Aviation Authority (CAA), 2016a). This enables identification of impacts on aviation receptors in the immediate vicinity of the Array Area including low-visibility helicopter operations to offshore installations (e.g. oil and gas platforms).
- Secondary Aviation and Radar Study Area:
  - The Secondary Aviation and Radar Study Area is defined by the range of the aviation receptors; in particular, Air Traffic Control (ATC) and Air Defence (AD) Primary Surveillance Radars (PSRs) which have the potential to be impacted by the Proposed Development. The Secondary Aviation and Radar Study Area covers potential receptors in the north-east of Scotland that could potentially be affected by Wind Turbines located within the Array Area. Although the operating range of aviation radars can be up to 200 nm (370 km), it is only the radar coverage over the Array Area that needs to be considered, as the question of whether the Wind Turbines themselves are visible to radar is the determining factor relating to aircraft safety.
  - This Secondary Aviation and Radar Study Area also encompasses the Export Cable Corridor which enables any potential impacts on aviation receptors during installation of the Offshore Export Cables to be determined; in particular, at the Landfall location in respect of physical safeguarding zones associated with aviation Communication, Navigation and Surveillance (CNS) equipment such as navigation beacons.

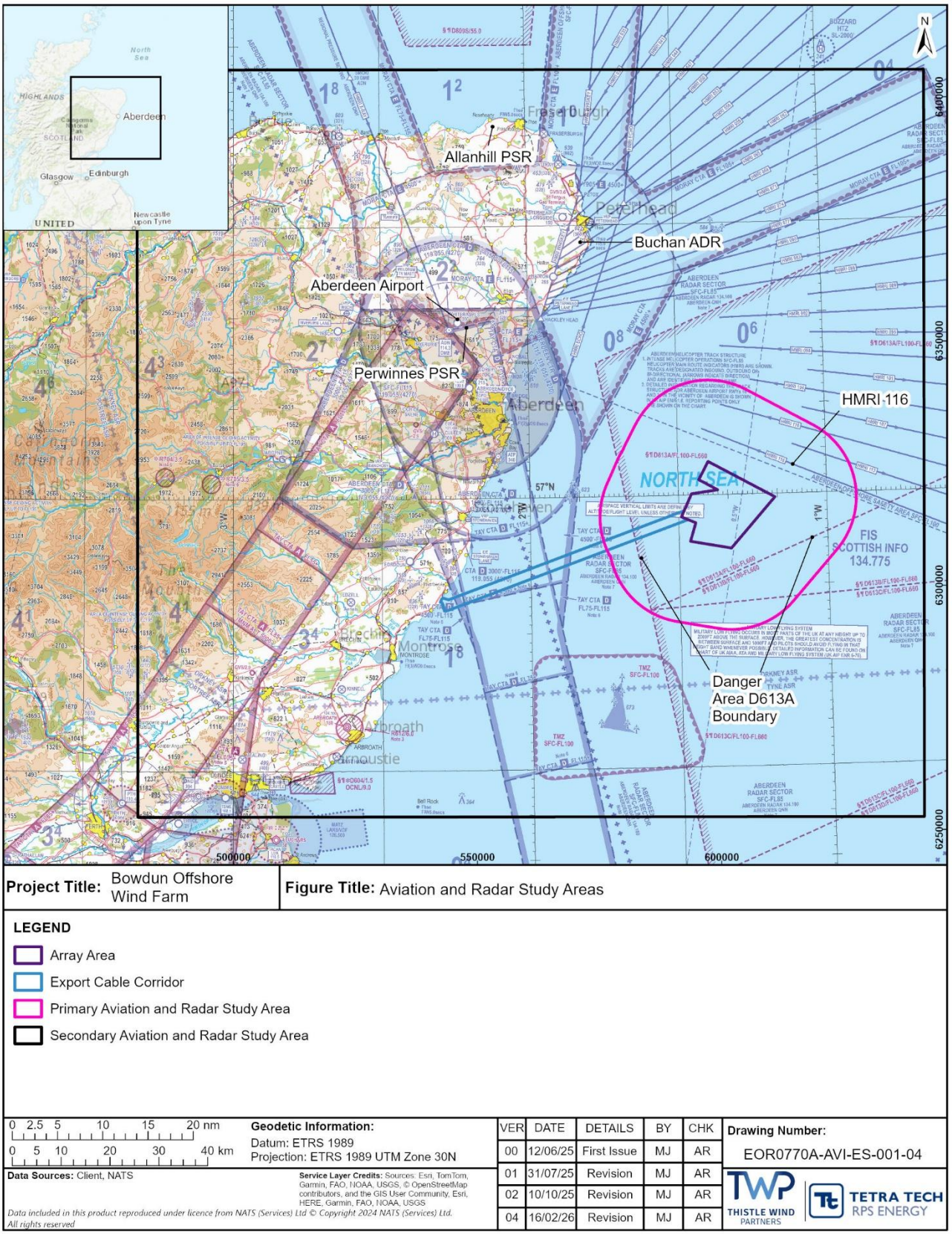

Figure 2.1: Aviation and Radar Study Areas and Locations of Aviation Receptors

3 Methodology

3.1 Introduction

3.1.1 The Aviation and Radar Study Areas have been derived taking into account the immediate vicinity of the Proposed Development, the consultation criteria for aviation assets as described in CAP 764 (CAA, 2016a) and a wider study area determined by the range of potentially affected radar systems.

3.1.2 The Aviation and Radar Study Areas have been assessed following a desktop review of existing and publicly available data. No radar modelling has been carried out as part of this assessment as data collected to inform the Bowdun Offshore Scoping Report (Bowdun Offshore Wind Farm Limited (BOWFL), 2024) are appropriate sources of information to inform the assessment of impacts for the Proposed Development. In particular, Ministry of Defence (MoD) and National Air Traffic Services (NATS) have carried out in-house radar modelling in order to confirm potential impact on their respective radar systems, the outcome of which are reflected in their scoping responses contained in the Scoping Opinion and addressed in Table 15.4, Volume 2, Chapter 15: Aviation and Radar.

3.2 Desktop Study

3.2.1 An initial desk-based review has been undertaken to consider the aviation aspects likely to be affected by the Proposed Development.

3.2.2 Information on aviation receptors within the Aviation and Radar Study Areas was collected through the detailed desktop review of existing publications and datasets used to inform the assessment; these are summarised in Table 3.1.

Table 3.1: Summary of Key Desktop Datasets for Aviation and Radar

Title	Source	Extent	Year	Author
United Kingdom (UK) Integrated Aeronautical Information Package (IAIP)	CAA	UK-wide	2025a	CAA
Visual Flight Rules (VFR) Aviation Chart	CAA	UK-wide	2025b	CAA
UK Military Aeronautical Information Publication (Mil AIP)	MoD	UK-wide	2025	MoD
Self-Assessment Maps	NATS	UK-wide	2025	NATS

3.2.3 A detailed desktop review has been undertaken to characterise existing and future aviation baseline conditions within the Aviation and Radar Study Areas to inform this assessment. This was undertaken by reviewing the relevant aviation legislation and guidance documents, as well as data sources such as aviation flying charts and other flight information publications; in particular, the UK IAIP. The study assessed potential impact on the following aviation receptors:

- civil airport Instrument Flight Procedures (IFPs) (including Navigational Aids (NAVAIDs));
- military aerodrome IFPs (including NAVAIDs);
- civil ATC radar;
- military ATC radar;
- military AD radar;
- military low flying and Search and Rescue (SAR) helicopter operations;
- Helicopter Main Route Indicators (HMRIs);
- offshore helicopter installations (oil and gas platforms);
- local airspace restrictions (Prohibited/Restricted/Danger Areas and Military Practice and Exercise Areas (PEXAs)); and
- Meteorological (Met) Office radar.

3.3 Maximum Design Scenario

3.3.1 The Maximum Design Scenario for the Proposed Development considered for potential impacts on Aviation and Radar receptors is as follows:

- installation of up to 40 Wind Turbines;
- maximum tip height up to 359.12 m above Lowest Astronomical Tide (LAT);
- 326 m maximum rotor diameter;
- up to three OSPs with a maximum height of 60 m above LAT; and
- construction period of up to five years.

3.4 Site-specific Surveys

3.4.1 At the request of Aberdeen Airport, the Applicant commissioned an IFP assessment to be carried out by Trax, Aberdeen Airport's CAA-accredited Approved Procedure Design Organisation (APDO). The IFP assessment report can be found in Volume 3, Technical Appendix 15.2: Instrument Flight Procedure Safeguarding Report Aberdeen Airport and is discussed further in Section 4.3. No other site-specific surveys have been undertaken to inform the Aviation and Radar Technical Report.

4 Baseline Characterisation

4.1 Introduction

4.1.1 This section defines the baseline characterisation resulting from the desktop studies outlined above and discusses the IFP assessment carried out by Trax (see Volume 3, Technical Appendix 15.2: Instrument Flight Procedure Safeguarding Report Aberdeen Airport).

4.2 Airspace Structure

4.2.1 The Proposed Development's Array Area is situated in an area of Class G uncontrolled airspace which is established from the surface up to Flight Level (FL) 195 (19,500 ft). An FL is a standard nominal altitude of an aircraft, in hundreds of feet, based upon a standardised air pressure at sea level. Above FL 195, the airspace is Class C controlled airspace which extends from FL 195 to FL 245 (24,500 ft) and forms Temporary Reserved Area 007B which exists to aid, and provide flexibility to, military training and operations. Class C controlled airspace then continues above FL 245 (24,500 ft) and contains upper air routes mainly utilised by aircraft routeing between Europe and North America. In Class C and G airspace, the following ATS rules apply:

- Class C airspace: Aircraft operating within Class C controlled airspace (i.e. above FL 195) must be in receipt of an ATS from NATS En-Route Public Limited Company (NERL) or a separate authorised military service provider; and
- Class G airspace: Aircraft can operate in this area of uncontrolled airspace without mandatory requirement to be in communication with, or receive a radar service from, an ATC unit. Pilots of aircraft operating under VFR in Class G airspace are ultimately responsible for seeing and avoiding other aircraft and obstructions.

4.3 Evaluation of the Proposed Development

4.3.1 The Proposed Development is situated in a relatively complicated piece of airspace and within range of aviation radars. A pictorial representation of the Proposed Development location and potential aviation receptors (such as Danger Area boundaries and location of airports) is depicted in Figure 2.1.

4.3.2 The evaluation results of the aviation receptors potentially impacted by Wind Turbines within the Proposed Development are as follows:

Civil Airport IFPs (Including NAVAIDs)

4.3.3 The nearest major civil airport to the Array Area is Aberdeen Airport located 27 nm (50 km) to the north-west which is operated by NATS. The published obstacle safeguarding area (as outlined in CAP 764 (CAA, 2016a)) for airports/aerodromes of this nature is 30 nm (56 km); therefore, the Proposed Development is inside the safeguarding area for Aberdeen Airport's IFPs.

4.3.4 As outlined in Section 3.4, the Applicant commissioned an IFP assessment to be carried out by Trax, Aberdeen Airport's CAA-accredited APDO. The IFP assessment report can be found at Volume 3, Technical Appendix 15.2:

Instrument Flight Procedure Safeguarding Report Aberdeen Airport. The results confirmed that, in order to accommodate the Proposed Development, the following aspects of the airport's published procedures would be affected as follows:

- the Airfield Reference Point (ARP) southeast Minimum Sector Altitude (MSA) sector would be required to be increased by 100 ft, from 2,100 ft to 2,200 ft.

4.3.5 From an IFP point of view, this increase of 100 ft could be incorporated simply as the initial approach altitudes for the other airport IFPs are 2,500 ft and 2,300 ft respectively (i.e. no higher than the change required by the Proposed Development).

4.3.6 The Export Cable Corridor and Landfall location are located outside the physical safeguarding areas of any aviation CNS infrastructure.

Military Aerodrome IFPs (Including NAVAIDs)

4.3.7 The nearest military aerodrome to the Array Area is Leuchars Station located 56 nm (104 km) to the south-west. The published obstacle safeguarding area for aerodromes of this nature is 30 nm (56 km) therefore, the Proposed Development is outside the safeguarding area of any military aerodromes and no military aerodrome IFPs will be affected by the Proposed Development's Wind Turbines.

Civil ATC Radars

4.3.8 The nearest civil ATC radars to the Array Area are the NATS Perwinnes PSR located 26 nm (48 km) to the north-west and the Allanshill PSR located 43 nm (80 km) to the north-west. The proposed Wind Turbines are highly likely to be in Radar Line of Sight (RLoS) of both PSRs. There are no other civil ATC radars that can be affected by the Proposed Development's Wind Turbines.

Military ATC Radars

4.3.9 The nearest military ATC radar to the Array Area is the Leuchars Station PSR located 56 nm (104 km) to the south-west. The operating range of the Leuchars PSR is 60 nm (111 km) therefore it is highly unlikely that the proposed Wind Turbines will be in RLoS of the radar. This was confirmed by MoD in their scoping response which is contained within the Scoping Opinion and addressed in Table 15.4 of Volume 2, Chapter 15: Aviation and Radar. Consequently, no military ATC radars will be affected by the Proposed Development's Wind Turbines.

Military Air Defence Radars

4.3.10 The nearest military AD radar to the Array Area is located at Buchan 28 nm (52 km) to the north-west. The proposed Wind Turbines are highly likely to be in RLoS of the Buchan AD PSR. This was confirmed by MoD in their scoping response which is contained within the Scoping Opinion and addressed in Table 15.4 of Volume 2, Chapter 15: Aviation and Radar.

Military Low Flying and SAR Helicopter Operations

4.3.11 The Array Area is located more than 12 nm (22 km) from the UK coastline and, therefore, is technically outside the UK Military Low Flying System; however, it is recognised that military aircraft may still be required to operate at low-level in the vicinity of the Proposed Development. Installation and presence of Wind Turbines can pose a physical obstruction to aviation operations and can be difficult to see from the air, particularly in poor meteorological conditions, leading to a potential increase in obstacle collision risk. Furthermore, during the construction phase, the presence and movement of installation vessels (with onboard cranes) may also present a potential obstacle collision risk to aircraft operations. Military aircraft can operate down to 100 ft above surface level over the sea.

4.3.12 UK SAR helicopters conducting operational missions are not constrained by the normal rules of the air and operate in accordance with their Aircraft Operator Certificate, which allows them flexibility to manoeuvre, as required, for the particular mission being carried out. Assessment of potential impacts on SAR operations is presented in Volume 2, Chapter 15: Aviation and Radar. An Emergency Response Cooperation Plan (ERCoP) will be developed post-consent in consultation with the Maritime and Coastguard Agency (MCA).

HMRIs

4.3.13 HMRIs are established to support the transport of personnel and logistics to offshore oil and gas installations. HMRIs provide a network of offshore routes used by civilian helicopters to facilitate an obstacle free zone for safe flight when in-flight Visual Meteorological Conditions cannot be met. The HMRI structure therefore provides both an identification of common flight paths and a safe means of traffic flow. HMRI 116 is the nearest HMRI to the Array Area and is located approximately 3 nm (5.55 km) to the north; it is primarily used for helicopter flights from Aberdeen Airport to the offshore oil and gas installations in the North Sea.

4.3.14 Construction of Wind Turbines within 2 nm (3.8 km) either side of an HMRI would have the potential to restrict operations below the routine operational altitudes when icing conditions exist. The ability of a helicopter to operate at the expected altitudes would be dependent upon the icing level (the 0° isotherm). In this situation, helicopters operating on HMRIs need an 'escape-route' if icing conditions are encountered unexpectedly; this would inevitably involve a descent. However, as outlined in CAP 764 (CAA, 2016a), CAA guidance is that, provided there are no Wind Turbines within 2 nm (3.8 km) on one side of an HMRI, then helicopter operations should not be affected. Consequently, no HMRIs will be affected by the Proposed Development's Wind Turbines.

Offshore Helicopter Installations (Oil and Gas Platforms)

4.3.15 CAP 764 (CAA, 2016a) recommends that wind farm developers consult with the owners/operators of offshore helicopter installations when a development is within 9 nm (17 km) of any helicopter installation. The nearest offshore helicopter installation to the Array Area is the Buzzard platform which is located approximately 45 nm (84 km) to the north-north-east. Due to the distancing,

the proposed Wind Turbines will not adversely impact helicopter operations at any offshore helicopter installations. Consequently, no offshore helicopter installations will be affected by the Proposed Development's Wind Turbines.

Local Airspace Restrictions (Prohibited/Restricted/Danger Areas and Military PEXAs)

4.3.16 The Array Area lies within the lateral boundaries of Danger Area D613A which is activated periodically by MoD by means of the Notice to Aviation system. It is activated from FL 100 (10,000 ft) up to FL 550 (55,000 ft) and is used for military air combat training and supersonic flight. Although the Array Area is located within the lateral boundaries of D613A, military operations only commence from 10,000 ft above the Array Area. Consequently, military operations in D613A will not be affected by the Proposed Development.

Met Office Radar

4.3.17 The closest Met Office radar system is located at Hill of Dudwick near Ellon, Aberdeenshire. It is located 30 nm (56 km) to the north-west of the Array Area which is outside the 11 nm (20 km) safeguarding area for radars of this nature. Due to the distancing, the proposed Wind Turbines will not be in RLoS of the nearest met radar. Consequently, no met radars will be affected by the Proposed Development's Wind Turbines.

4.4 Key Aviation Stakeholders

4.4.1 The desktop study carried out has identified the following key aviation stakeholders to the Proposed Development as evaluated in this report:

- Aberdeen Airport;
- MCA;
- MoD; and
- NATS.

4.5 Potential Receptors

4.5.1 This technical assessment has identified that the following aviation receptors may be adversely affected by the Proposed Development which will be assessed in Volume 2, Chapter 15: Aviation and Radar of the Offshore EIA Report:

- Aberdeen Airport's IFPs;
- MoD Buchan AD PSR;
- Military low flying and SAR helicopter operations within the Array Area; and
- NATS Allanshill and Perwinnes ATC PSRs.

4.6 Potential Mitigation Requirements

4.6.1 The detailed impact assessment and embedded mitigation measures, including any additional mitigation, are provided in Volume 2, Chapter 15: Aviation and Radar. The key receptors and impacts to be considered along with the approach to engagement and mitigation is summarised as follows:

Aberdeen Airport's IFPs

4.6.2 The IFP assessment report carried out by Trax (Volume 3, Technical Appendix 15.2: Instrument Flight Procedure Safeguarding Report Aberdeen Airport) confirmed the parameters by which the affected Aberdeen Airport IFPs, or aspects of IFPs, could be amended in order to mitigate any adverse impacts created by the Proposed Development's Wind Turbines. The amendments required would be as follows:

- the ARP southeast MSA sector would be required to be increased by 100 ft, from 2,100 ft to 2,200 ft.

4.6.3 From an IFP point of view, this increase of 100 ft could be incorporated simply as the initial approach altitudes for the other airport IFPs are 2,500 ft and 2,300 ft respectively (i.e. no higher than the change required by the Proposed Development).

4.6.4 Any changes to the IFPs will be subject to Aberdeen Airport and CAA approval.

MoD Buchan Air Defence PSR

4.6.5 MoD has a recognised process for entering into agreement for AD PSR mitigation. The Applicant will need to engage with MoD regarding the suitability of 3-Dimensional Non-Automatic Initiation Zones (3-D NAIZs) as mitigation. This involves in-built software technology which enables Wind Turbine clutter to be removed from AD radar displays while allowing aircraft initiated outside 3D-NAIZs to continue to be tracked through the wind farm. Typically, OWF 3D-NAIZs are established 2 km radius from the centre of each Wind Turbine up to a ceiling height 2,500 ft. In order to progress this mitigation, MoD will advise the Applicant whether it would be willing to consider 3D-NAIZ as mitigation. Acceptance of 3D-NAIZ would allow MoD to remove their planning objection subject to agreement of a suitably worded Section 36 planning condition.

4.6.6 MoD is also working jointly with the Offshore Wind Industry Council (OWIC) and other developers to develop and procure replacement/additional AD surveillance technology in order to mitigate the impact of offshore Wind Turbines on UK-based AD radars. The ultimate aim will be to have mitigations in place to support offshore wind developments from 2029.

Military Low Flying and SAR Helicopter Operations

4.6.7 For military low flying, OWFs are much less of a consideration, when compared to onshore wind farms, as lower amounts of low flying are conducted over the sea. For military low flying in general, there are two main issues: location and lighting. For offshore developments, location is generally not an issue due to lack of populated areas and there will always be a requirement for relevant aviation warning lighting to be fitted, in accordance with CAA (2016b): CAP 393, Air Navigation Order 2016, Article 223; this is generally sufficient to avoid MoD objections on the basis of adverse impact on military low flying operations. However, it should be noted that whilst the mapped extent of the UK Military Low Flying System finishes 12 nm (23 km) offshore, these activities may be conducted beyond this area. As such, subject to verifying the precise location and height of structures above sea level, the MoD may request that structures

associated with an OWF (including OSPs) are fitted with aviation warning lighting when there is no mandatory requirement for installation. For the Proposed Development, MoD are not expected to object however they are expected to request bespoke aviation lighting to be installed.

4.6.8 In terms of UK SAR, helicopter operators do not generally object to OWF proposals; however, there are specific guidelines that need to be followed, and the MCA will be consulted at the relevant stages of the planning process. In particular, MCA will require consultation on the specific Wind Turbine layout and will require input into the final Wind Turbine Lighting and Marking Plan (LMP) to ensure compatibility in the event of rescue missions within the wind farm.

NATS Allanshill and Perwinnes ATC PSRs

4.6.9 NATS has proven processes and techniques to mitigate the adverse impact of Wind Turbines on their PSRs. The Applicant will need to engage with NATS about potential mitigation solutions. NATS preferred solution is likely to be Multi-Radar Tracker (MRT) blanking; a technical mitigation solution routinely offered by NATS that removes Wind Turbine returns from ATC radar displays. In combination, NATS are likely to request that the MRT blanking is accompanied by a Transponder Mandatory Zone (TMZ). This provides an added layer of mitigation by ensuring that all aircraft transiting overhead the 'blanked' area carry a serviceable transponder which enables them to be tracked by means of Secondary Surveillance Radar without reliance on PSR. Implementation of a TMZ requires developers to submit an Airspace Change Proposal to the CAA for which a formal airspace change process will need to be followed.

5 Summary

5.1.1 This assessment has determined that the following aviation receptors may be affected by the Proposed Development:

- Aberdeen Airport's IFPs;
- MoD Buchan AD PSR;
- Military low flying and SAR helicopter operations within the Array Area; and
- NATS Allanshill and Perwinnes ATC PSRs.

5.1.2 The key points that have led to this assessment and a summary of potential impacts of the Proposed Development on aviation receptors are outlined in Table 5.1.

Table 5.1: Summary of Potential Impacts on Aviation Receptors

Aviation Criteria	Potential Impacts	Potential Mitigation Requirements
Civil Airport IFPs (including NAVAIDs)	Aberdeen Airport: The Proposed Development's Wind Turbines are within the safeguarding area of Aberdeen Airport. An IFP assessment by Trax (Volume 3, Technical Appendix 15.2: Instrument Flight Procedure Safeguarding Report Aberdeen Airport) has revealed that the Proposed Development will create physical obstacles within the airport's safeguarded area which, in turn, will adversely impact aspects of the airport's IFPs.	The IFP assessments carried out by Trax (Volume 3, Technical Appendix 15.2: Instrument Flight Procedure Safeguarding Report Aberdeen Airport) outlined the parameters by which the affected IFPs, or aspects of IFPs, would need to be amended in order to mitigate any adverse impacts created by the Proposed Development's Wind Turbines. These measures will need to be implemented ahead of the construction phase of the Proposed Development.
Military Aerodrome IFPs (including NAVAIDs)	No effect on this receptor.	None required.
Civil ATC Radar	The Proposed Development's Wind Turbines will potentially be within radar coverage of the NATS Perwinnes and Allanshill PSR systems. This impact will be relevant to the Operation and Maintenance (O&M) phase of the Proposed Development as impact on PSR systems is only applicable when Wind Turbine blades are moving.	NATS will carry out a Technical and Operational Assessment to confirm any adverse impact and, if needed, investigate the mitigation options available. NATS' preferred solution is likely to be MRT blanking with an accompanied TMZ.
Military ATC Radar	No effect on this receptor.	None required.
Military AD Radar	The Proposed Development's Wind Turbines will potentially be within radar coverage of MoD's Buchan Air Defence PSR. This impact will be relevant to the O&M phase of the Proposed Development as impact	MoD will need to be requested to investigate the potential mitigation options available. MoD's preferred solution is likely to be 3D-NAIZ mitigation or

Aviation Criteria	Potential Impacts	Potential Mitigation Requirements
	on PSR systems is only applicable when Wind Turbine blades are moving.	replacement/additional AD surveillance technology developed jointly by OWIC and MoD.
Military Low Flying and SAR Helicopter Operations	Installation, and presence of, Wind Turbines can pose a physical obstruction to aircraft. Furthermore, during construction, the presence and movement of installation vessels (with onboard cranes) may also present a potential obstacle collision risk.	The Applicant has submitted an outline LMP as part of the application (Volume 4, Appendix 31: Outline Lighting and Marking Plan). The LMP will be developed in consultation with the relevant stakeholders; in particular, MoD and MCA. The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting. Details of the Proposed Development's Wind Turbines are required to be included in aviation documentation and displayed on aviation charts. An ERCoP will also need to be developed in consultation with the MCA.
HMRIs	No effect on this receptor.	None required.
Offshore Helicopter Installations (oil and gas platforms)	No effect on this receptor.	None required.
Local Airspace Restrictions (Prohibited/ Restricted/ Danger Areas and Military PEXAs)	No effect on this receptor.	None required.
Met Office Radar	No effect on this receptor.	None required.

References

BOWFL (2024). *Bowdun Offshore Wind Farm Offshore Scoping Report*. Bowdun Offshore Wind Farm Limited. Available at: https://marine.gov.scot/sites/default/files/240822_-_bowdun_offshore_wind_farm_-_scop-0056_-_scoping_report_submission_240822_-_developer_to_md-lot.pdf. Accessed on: 26 March 2026.

CAA (2016a*). CAP 764 - CAA Policy and Guidelines on Wind Turbines (Version 6, February 2016)*. Civil Aviation Authority. Available at: https://www.caa.co.uk/publication/download/14561. Accessed on: 26 March 2026.

CAA (2016b). *CAP 393, Air Navigation: The Order and the Regulations (2016).* Civil Aviation Authority. Available at: https://www.caa.co.uk/our-work/publications/documents/content/cap-393/. Accessed on: 26 March 2026.

CAA (2025a). *CAP 032 - UK Integrated Aeronautical Information Package (2025).* Civil Aviation Authority. Available at: https://www.aurora.nats.co.uk/htmlAIP/Publications/2025-02-20-AIRAC/html/index-en-GB.html. Accessed on: 26 March 2026.

CAA (2025b). *Visual Flight Rules Chart (CAA, 2025)*. Civil Aviation Authority. Available at: https://nats-uk.ead-it.com/cms-nats/opencms/en/Charts/vfr-charts/. Accessed on: 26 March 2026.

MoD (2025). *UK Military Aeronautical Information Publication (Mil AIP) (2025).* Ministry of Defence. Available at: https://www.aidu.mod.uk/aip/aipVolumes.html. Accessed on: 26 March 2026.

NATS (2025). *NATS Self-Assessment Maps (2025).* Available at: https://www.nats.aero/services-products/services/wind-farms/n/wind-farms-self-assessment-maps/. Accessed on: 26 March 2026.

Scottish Government (2020). Sectoral Marine Plan for Offshore Wind Energy. 28 October 2020. Available at: https://www.gov.scot/publications/sectoral-marine-plan-offshore-wind-energy/. Accessed on: 26 March 2026.