



BERWICK BANK WIND FARM OFFSHORE ENVIRONMENTAL IMPACT ASSESSMENT

APPENDIX 14.1: AVIATION, MILITARY AND COMMUNICATIONS TECHNICAL REPORT



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1. INTRODUCTION

1. This Aviation, Military and Communications Technical Report has been produced to support the assessment of likely significant effects for the Environmental Impact Assessment (EIA) for the Berwick Bank Wind Farm (hereafter referred to as the 'Proposed Development'). The purpose of this Aviation, Military and Communications Technical Report is to identify the key Aviation, Military and Communications risks associated with the construction, operation and decommissioning of the Berwick Bank Wind Farm. This technical appendix supports the full assessment of the likely significant effects of the Proposed Development on aviation, military and communications in volume 2, chapter 14.

1.2. BACKGROUND

2. Berwick Bank Wind Farm Limited (BBWFL) is a wholly owned subsidiary of SSE Renewables Limited and will hereafter be referred to as 'the Applicant'. The Applicant is developing the Berwick Bank Wind Farm (hereafter referred to as 'the Project'). The Project is an offshore wind farm in the outer Firth of Forth and Firth of Tay, 37.8 km east of the Scottish Borders coastline (St Abb's Head) and 47.6 km to the East Lothian coastline.
3. The offshore elements of the Project (hereafter referred as the 'Proposed Development') of relevance to this Aviation, Military and Communications Technical Report comprise the following key components:
 - a maximum of 307 wind turbines and a maximum turbine tip height of 355 m above Lowest Astronomical Tide (LAT).

1.2.2. 2020 BERWICK BANK WIND FARM

4. Initially, the Proposed Development was one of two adjacent projects to be developed under Phase 2 of the former Firth of Forth Zone: namely '2020 Berwick Bank' and 'Marr Bank Wind Farm'. These developments were previously known as 'Seagreen 2' and 'Seagreen 3' respectively. Marr Bank Wind Farm was to be located immediately west of 2020 Berwick Bank.
5. In August 2020, the Applicant submitted an Offshore EIA Scoping Report for the 2020 Berwick Bank Wind Farm project (SSER, 2020). A Scoping Opinion was received from Scottish Ministers in March 2021 (The 2020 Berwick Bank Scoping Opinion (Marine Scotland Licensing and Operations Team (MS-LOT), 2021).

1.2.3. BERWICK BANK WIND FARM

6. Subsequently, the Applicant undertook to seek consent for one wind farm project. The Applicant combined its 2020 Berwick Bank and Marr Bank Wind Farm projects to create the Berwick Bank Wind Farm. The Applicant submitted the Berwick Bank Wind Farm Offshore Scoping Report in October 2021 (SSER, 2021a) and received the Berwick Bank Wind Farm Scoping Opinion from Scottish Ministers in February 2022 (MS-LOT, 2022).
7. With regard to the Berwick Bank Wind Farm Scoping Opinion (MS-LOT, 2022) and other pre-application advice from consultees, the Applicant undertook a boundary review of the Proposed Development array area in early 2022. In June 2022, the Applicant confirmed with MS-LOT its plans to further reduce the size of the area over which the Berwick Bank Wind Farm will be developed. The boundary changes are largely focused on the west and northern areas of the site and equate to a reduction in area of approximately 20%

from the boundary presented in the Berwick Bank Wind Farm Offshore Scoping Report (SSER, 2021a). The number and type of turbines proposed remain unchanged.

8. This technical report has been reviewed and updated, where relevant, in view of the boundary modifications announced in June 2022. The parameters of relevance to aviation, military and communications receptors (namely, general project location relative to radar, turbine numbers, type and the size of the Proposed Development array area) have either not changed or have reduced since the 2020 Berwick Bank Scoping Opinion (MS-LOT, 2021) was issued. Therefore, the airspace environment referenced, and the aviation issues identified in both Scoping Opinions are essentially the same. Further, there is considered to be no potential for greater impacts to result from the reduction of the Proposed Development array area.
9. To this end, the advice provided within both the 2020 Berwick Bank Scoping Opinion (MS-LOT, 2021) and the Berwick Bank Wind Farm Scoping Opinion (MS-LOT, 2022) continues to be relevant to the current proposal and has been regarded. Further detail on the incorporation of scoping advice is provided in volume 2, chapter 14. Where assessments have departed from scoping advice, or further communications with consultees took place after the publication of the Berwick Bank Wind Farm Scoping Opinion (MS-LOT, 2022), these communications are audited in the Audit Document for Post-Scoping Discussions (volume 3, appendix 5.1). The Audit Document provides the Applicant's reasoning and or justification for any deviation from scoping advice.

1.2.4. FORTH AND TAY WINDFARMS

10. There are four other offshore wind farm developments in the Firth of Forth and Tay: Neart na Gaoithe Wind Farm (NnG) (consented in 2018), Inch Cape Wind Farm (consented 2020) and the two component projects of Seagreen - Seagreen 1 (under construction) and Seagreen 1A Project (consented). The latter is located approximately 5 nm (10 km) from the Proposed Development. In aviation terms, the general location of the Proposed Development is similar to the other wind farms in the region, in particular the Seagreen projects. Therefore, the airspace environment and aviation issues identified for the component sites are similar to the Proposed Development. Given the proximity of Seagreen to the Proposed Development, the scoping information and findings from the assessments undertaken for these developments (as listed in the baseline section of this report (see Table 3.1) are considered to provide useful and relevant Information for the baseline review for Berwick Bank Wind Farm.

1.3. EFFECTS OF WIND TURBINES OF AVIATION

11. In general terms, the potential impacts of wind turbines on aviation are widely understood. The primary focus of an assessment of the potential impacts of a wind farm is to ensure that the flight safety of aircraft is not compromised. In essence, there are two dominant scenarios that lead to potential impacts:
 - physical obstruction: turbines can create physical obstructions to aircraft in flight; and
 - aviation radar systems: wind turbines can create unwanted interference with radar systems such that 'radar clutter' can appear on radar displays; this can seriously affect air traffic controllers' ability to provide Air Traffic Services (ATS) in a safe and effective manner. Radar clutter (or false radar returns) can confuse air traffic controllers by making it difficult to differentiate between real aircraft returns and returns that result from the detection of wind turbines. The appearance of multiple false returns in close proximity can also inhibit the radar's processing capacity such that false aircraft tracks can be presented in place of real aircraft.

1.4. SCOPE OF THIS REPORT

12. Effects on aircraft navigational 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, that seeks to identify whether the effect is likely to be 'acceptable' or 'not acceptable' to the providers of ATS.
13. This report identifies the baseline conditions for aviation and military receptors in the vicinity of the Proposed Development; relevant stakeholders, the risks associated with the Proposed Development and potential impacts on aviation and military receptors. This will enable the identification of possible mitigation requirements and options.
14. The scope of this technical report covers aviation and military receptors and the potential impacts of the Proposed Development on Air Traffic Control (ATC) and Air Defence (AD) capabilities, with reference to radar interference and operational safety. There is considered to be no potential for impacts on other forms of communication, such as interference with cellular telephone service coverage, television scanning telemetry or non-aviation radar, satellite communications (e.g. with offshore oil and gas), maritime communications, VHF radio and/or microwave links or any other forms of cabling (telecommunications and interlinks). This has been established with reference to the findings of the Infrastructure and Other Users assessment (volume 2, chapter 17) which reports there are no subsea telecommunications cables within the Proposed Development infrastructure and other users study area. No additional communications receptors have been highlighted by stakeholders during consultation. Further, reference has been made to other Environmental Statements for other offshore windfarms in the area submitted within the past 11 years (for example, Seagreen (Seagreen Wind Energy, 2012 and 2018), Inch Cape (Inch Cape Offshore, 2011 and 2018/2019) and NnG (EMU, 2019)). The findings of these assessments indicate that the Proposed Development would have no issues relating to communication infrastructure or services other than those aviation and military systems identified in this report.
18. The aviation, military and communications study area, together with the locations of the relevant aviation receptors, can be seen depicted on an aviation chart at Figure 2.1.
19. To confirm the validity of the aviation, military and communications study area, reference was made to the findings reported for offshore wind farms in close proximity to the Proposed Development, which are listed in Table 3.1. This body of literature assisted in identifying the relevant radars, and stakeholders, that may be affected. The 2020 Berwick Bank Scoping Opinion (MS-LOT, 2021) and the Berwick Bank Wind Farm Scoping Opinion (MS-LOT, 2022) are considered to further support the appropriateness of the aviation, military and communications study area.
20. The cumulative aviation, military and communications study area includes the area within 50 km of the Proposed Development. The cumulative effects assessment study area is presented in volume 2, chapter 14.

2. STUDY AREA

15. The aviation, military and communications study area is defined by the range within which aviation receptors; in particular, ATC and AD Primary Surveillance Radars (PSRs) could be affected by the Proposed Development. The operating range of these radars can be up to 200 nm (370 km). However, radars were identified for assessment within the aviation, military and communications study area on the basis the Proposed Development could realistically interfere with the base-level coverage of the radar (as this is the determining factor relating to aircraft safety). The extent of the aviation, military and communications study area is limited by the location of the most distant potential aviation receptor.
16. An area of 9 nm around the Proposed Development was also searched to ascertain the potential for interference with helicopters procedures into oil and gas platforms (of which there are none within the aviation, military and communications study area). The aviation, military and communications study area covers airspace designations including low flying areas and military practice areas in the immediate vicinity of the Proposed Development; and, airspace, as necessary, used by fixed-wing aircraft and helicopters on routes which may cross the Proposed Development.
17. The Proposed Development is located approximately 48 nm (88 km) to the south-east of Aberdeen Airport and 31 nm (57 km) to the north-east of Ministry of Defence (MoD) Leuchars Station, an active military aerodrome. The aviation, military and communications study area therefore incorporates radar on the north-east coast of England and east coast of Scotland that could potentially detect wind turbines within the Proposed Development array area.

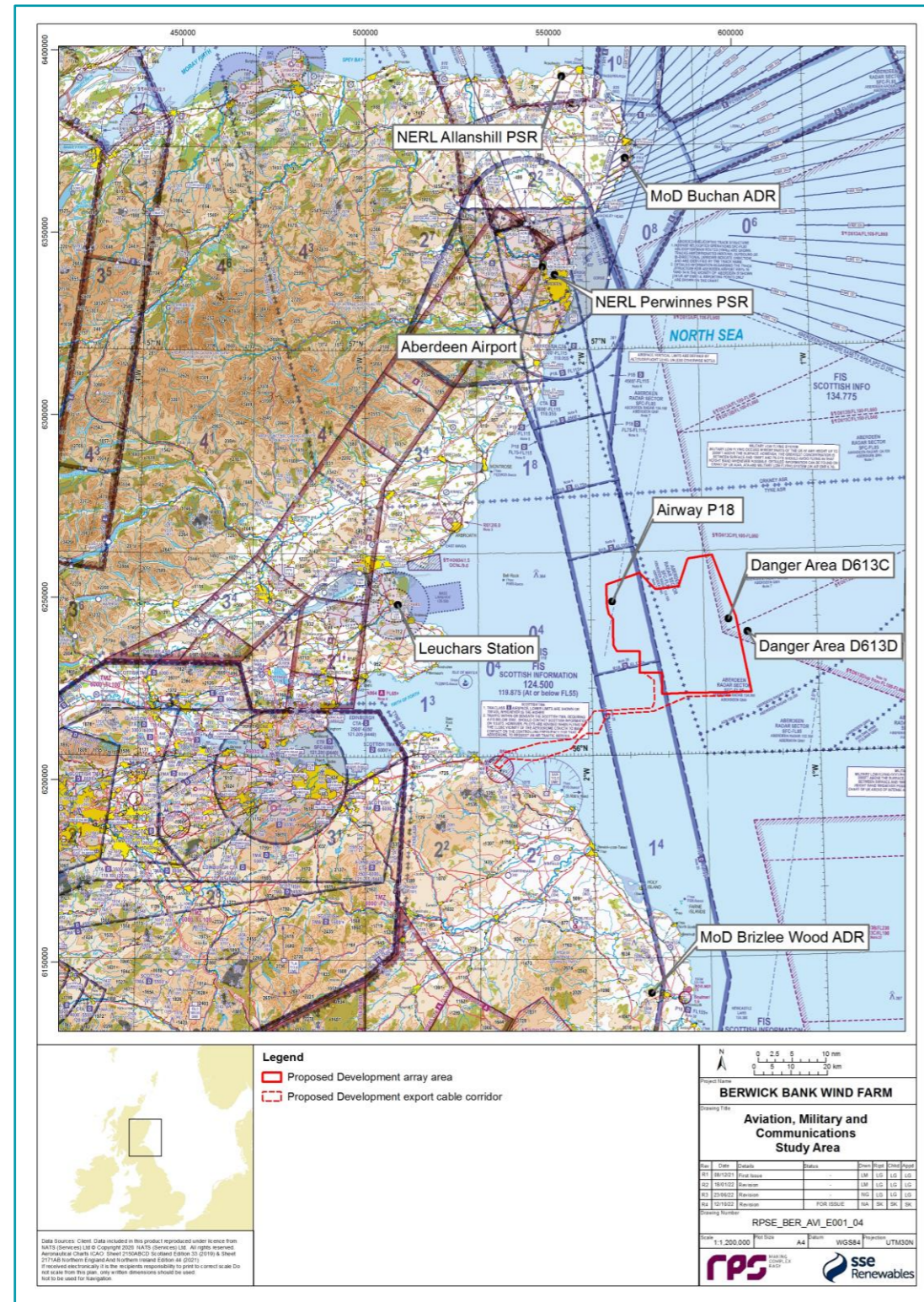


Figure 2.1: Aviation, Military and Communications Study Area and Associated Receptors

3. APPROACH TO BASELINE CHARACTERISATION

3.1. METHODOLOGY

- Relevant aviation and military receptors were identified for further consideration within this technical report from an initially broad aviation, military and communications study area (see section 2). This was with reference to the consultation criteria for aviation assets as described in Civil Aviation Authority (CAA) (2016): *Policy and Guidelines on Wind Turbines*.
- An initial desk based review of existing and publicly available data was undertaken to consider the aviation and military aspects likely to be affected by the Proposed Development. This review utilised the data sources listed in Table 3.1, as well as other available datasets. Effects on radar would only be apparent immediately above the Proposed Development array area; therefore, if the receptor is not likely to have radar coverage over the Proposed Development, then likely significant effects will not result. As the baseline was developed, potential receptors within the aviation, military and communications study area were mapped and considered relative to the location of the Proposed Development array area. Only receptors likely to provide radar coverage over the Proposed Development have been identified as relevant types receptors.

3.1.2. AVIATION CONSULTATION CRITERIA

- To assess the potential effect of wind turbines on aviation and military receptors, there are specific criteria for identifying whether consultation will be required with any particular civilian aerodromes or stakeholders. In particular, CAA (2016): *Policy and Guidelines on Wind Turbines* specifies the distances from various aerodromes where consultation should take place. The types of aerodromes relevant to the Proposed Development are as follows:
 - aerodromes equipped with PSR: 30 km; and
 - licensed aerodromes where wind turbines are located in close proximity to published Instrument Flight Procedures (IFPs): 47 km.
- These distances are for guidance only, but it is possible that aerodromes could object to wind farm proposals that are outside this consultation criteria. As such, the distances outlined above are intended as a prompt for consultation between developers and aviation stakeholders.
- Furthermore, developers need to consider the possible effects of wind turbines upon long range radar systems such as the National Air Traffic Services En-Route PLC's (NERL's) network of PSRs as well as Secondary Surveillance Radars (SSRs) and other communications systems (i.e. radio transmitters and receivers) and navigation facilities (i.e. beacons) located around the country.
- The criteria listed above for civilian aerodromes is broadly the same as that used by MoD for military aerodromes. However, it is also necessary to take account of other military aviation activities such as low flying and AD radar. Specific military activities that need to be considered include:
 - MoD aerodromes (training and operational);
 - Military ATC radars;
 - Military AD radars;
 - Military low flying; and
 - UK Meteorological (Met) radars (operated by UK Met Office but administered, in the initial planning stages, by MoD).

3.1.3. DESKTOP STUDY

27. Information on aviation receptors within the aviation, military and communications study area was collected through a detailed desktop review of existing studies and datasets. In particular, the UK Integrated Aeronautical Information Package (UK IAIP) and consultee responses which are presented in full in volume 2, chapter 14. These are summarised at Table 3.1 below.

Table 3.1: Summary of Key Desktop Reports

Title	Source	Year	Author
Seagreen Alpha/Bravo Environmental Statement	Seagreen Wind Energy	2012	Seagreen Wind Energy
Seagreen Phase 1 Scoping Report	Seagreen Wind Energy	2017	Seagreen Wind Energy
Revised Design Inch Cape Offshore Transmission Works Scoping Report	Inch Cape Offshore Wind Limited	2017	Inch Cape Offshore Wind Limited
Revised Design NnG Offshore Wind Farm Scoping Report	NnG Offshore Wind Farm Limited	2017	NnG Offshore Wind Farm Limited
Seagreen Scoping Opinion for optimised Seagreen Project	Seagreen Wind Energy	2017	MS-LOT
Revised Design Inch Cape Offshore Transmission Works Environmental Statement	Inch Cape Offshore Wind Limited	2018	Inch Cape Offshore Wind Limited
Optimised Seagreen Phase 1 Project Environmental Statement	Seagreen Wind Energy	2018	Seagreen Wind Energy
Inch Cape Offshore Wind Farm Environmental Statement	Inch Cape Offshore Wind Limited	2013	Inch Cape Offshore Wind Limited
Near na Gaoithe Offshore Wind Farm Environmental Statement	Near na Gaoithe Offshore Wind Farm Limited	2018	Near na Gaoithe Offshore Wind Farm Limited
Seagreen Airspace Change Proposal Regulatory Decision	Seagreen Wind Energy	2020	Seagreen Wind Energy
Berwick Bank Scoping Report	SSER	2021	SSER

28. A detailed desktop review has been undertaken to characterise existing and future aviation baseline conditions within the aviation, military and communications study area 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 Integrated Aeronautical Information Package (UK IAIP). The study assessed potential impact on the following aviation receptors:

- Civil Airport Patterns and Procedures;
- Military Aerodrome Patterns and Procedures;
- Civil ATC Radar;
- Military ATC Radar;
- Military AD Radar;
- Low Flying (including Search and Rescue (SAR) operations);
- Helicopter Main Routes (HMRs); and
- Offshore Helicopter Installations (oil and gas platforms).

3.1.4. SITE-SPECIFIC SURVEYS

29. No site-specific surveys have been undertaken to inform the Aviation, Military and Communications Technical Report. No radar modelling has been carried out on the basis the data collected from existing

data sources (Table 3.1), coupled with ongoing consultation and mitigation discussions with relevant stakeholders, are considered appropriate and sufficient sources of information to inform the assessment of effects for the Proposed Development.

3.1.5. CONSULTATION

30. The scope of this technical report and the assessment of effects for the Proposed Development has been refined and or confirmed by the representations made in response to scoping and advice from MS-LOT. This advice and how it has factored in the development of these reports is set out in volume 2, chapter 14.

4. BASELINE CONDITIONS

4.1. AIRSPACE STRUCTURE

31. The proposed Development is situated in an area of Class G uncontrolled airspace which is established from the surface up to the base of Class D controlled airspace in the form of Airway P18.

32. The western portion of the Proposed Development is located underneath Airway P18 (see Figure 2.1) which is primarily used by commercial aircraft routing to, and from, Aberdeen Airport. The airway is active from Flight Level (FL) 115 (11,500 ft) to FL 195 (19,500 ft) in the north-west section of the Proposed Development and from FL 155 (15,500 ft) to FL 195 (19,500 ft) in the south-west section. The north-eastern portion of the Proposed Development overlaps the lateral boundaries of Danger Areas D613C and D613D (see Figure 2.1). These Danger Areas are activated periodically from FL 100 (10,000 ft) to FL 660 (66,000 ft) for military air combat training and supersonic flight. Within Class G and D airspace, the following ATC rules apply:

- Class G airspace - any aircraft can operate in this area of uncontrolled airspace without any mandatory requirement to be in communication with, or receive a radar service from, any ATC unit. Pilots of aircraft operating under Visual Flight Rules (VFR) in Class G airspace are ultimately responsible for seeing and avoiding other aircraft and obstructions; and
- Class D airspace is established from FL 115 (11,500 ft) to FL 195. All aircraft operating in this airspace must be in receipt of an air traffic service from NERL or military controllers located at the NERL Area Control Centre.

33. As described above, the Proposed Development is situated in a relatively complicated piece of airspace and within range of aviation radars as well as being in close proximity to other renewable energy developments. A pictorial representation of the Proposed Development location and potential aviation receptors (airspace, airports and radar locations) is depicted on an aviation chart at Figure 2.1.

4.2. KEY AVIATION STAKEHOLDERS

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

- Aberdeen Airport;
- Maritime and Coastguard Agency (MCA);
- MoD; and
- NERL.

4.3. EVALUATION OF THE BERWICK BANK SITE

35. The evaluation results of the aviation receptors potentially impacted by wind turbines within the Proposed Development are as follows.

Civil airport patterns and procedures

36. Aberdeen and Edinburgh airports are the nearest major civil airports to the Proposed Development. None of the airports' published procedures will be affected by the Proposed Development's wind turbines.

Military aerodrome patterns and procedures

37. MoD Leuchars Station is the nearest military aerodrome to the Proposed Development. None of the aerodrome's published procedures will be affected by the Proposed Development's wind turbines.

Civil ATC radar

38. The Proposed Development is located approximately 46 nm (85 km) from NERL's Perwinnes PSR and approximately 74 nm (137 km) from NERL's Allanshill PSR. These radars are used by NERL's ATC Centre at Prestwick and Aberdeen Offshore ATC to support civilian ATC and en-route operations for aircraft operating on civilian air routes and for aircraft arriving and departing to/from Aberdeen Airport. It is possible that wind turbines within the northern third portion of the Proposed Development may adversely impact one, or both, of these PSRs. In the event that radar mitigation is required, Aberdeen Airport and NERL are highly likely to offer a mitigation solution that will enable any adverse impact on either PSR to be overcome; see paragraphs 46 and 47.

Military ATC radar

39. The Proposed Development is located approximately 31 nm (57 km) north-east of MoD Leuchars Station. Wind turbines within the Proposed Development are highly likely to be visible to the Leuchars PSR and adversely impact on ATC operations; see paragraphs 48 and 49. Royal Air Force (RAF) Spadeadam is an Electronic Warfare Training Facility operated by MoD to provide training to aircrew in detecting and countering hostile radar threats associated with surface to air guided weapon systems. Located at Spadeadam is the Deadwater Fell ATC PSR which is approximately 55 nm (102 km) to the south-west of the Proposed Development.

Military AD radar

40. The MoD's Air Surveillance and Control System (ASACS) organisation operates AD radars at Remote Radar Head (RRH) Buchan, which is located approximately 60 nm (111 km) to the north, and at RRH Brizlee Wood, which is located 44 nm (82 km) to the south. Wind turbines within the Proposed Development are highly likely to be visible to one, or both, AD radars; see paragraphs 50 to 52.

Low flying (including SAR)

41. Military low flying and SAR helicopter operations can take place in the vicinity of the Proposed Development; however, any impact is likely to be resolvable by implementation of appropriate aviation lighting; see paragraphs 53 and 54.

HMRs

42. No HMRs will be affected by the Proposed Development.

Offshore helicopter installations (oil and gas platforms)

43. No offshore helicopter installations will be affected by the Proposed Development.

Met Office radar

44. The Proposed Development is outside the consultation distance for any Met Office radar systems; consequently, no Met Office radars will be affected by the Proposed Development.

5. POTENTIAL IMPACTS AND MITIGATION REQUIREMENTS

45. The Proposed Development is likely to create adverse impacts on some aviation receptors. A more detailed explanation of the potential impacts and likely mitigation requirements is as follows:

Civil ATC radar

46. NERL use their network of long range PSRs to provide maximum radar coverage over UK airspace; but in particular, for control of aircraft operating in controlled airspace. Previous experience of dealing with NERL has identified that the impact of wind turbines can usually be mitigated by means of Multi-Radar Tracker (MRT) blanking or Single-Cell blanking, which are technical mitigation solutions routinely offered by NERL. However, in combination, NERL often request that blanking of this nature 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 SSR without reliance on PSR. Implementation of a TMZ requires developers to submit an Airspace Change Proposal (ACP) to the CAA for which a formal airspace change process has to be followed. CAA advises that the ACP process takes approximately two years to complete and that they will not provide any advanced assessment as to whether it will be approved. Equally, it should be noted that the CAA's consent decision needs to be finalised at least six months ahead of construction so that the TMZ can be implemented in the required timescales.

47. In order to confirm the potential impact on their PSRs, NERL can be commissioned to carry out a Technical and Operational Assessment (TOPA) which will confirm any impact and whether a mitigation solution is required. Only once a commercial agreement is in place would implementation of the mitigation be certain; therefore, consultation with NERL should be carried out at the earliest opportunity.

Military ATC radar

48. RAF ATC units not only provide navigational services to aircraft approaching and departing the aerodrome, but they are also usually responsible for the provision of such services to any aircraft operating within 40 nm (and sometimes 60 nm). If an offshore wind farm is within the operating range of a military ATC unit, it is possible that the turbines will be detectable on ATC radar displays. This direct, permanent effect will hamper the ATC operators' ability to distinguish actual aircraft returns from those created by the wind turbines and degrade the safety and efficiency of the ATS being provided.

49. In terms of mitigation, MoD has a recognised process for entering into agreement for ATC PSR mitigation although, currently, no enduring radar mitigation solution has been accepted into service. The current process requires developers to submit a mitigation proposal which, once accepted, allows MoD to withdraw their objection subject to agreement of a suitably worded suspensive planning condition; thereby, de-risking the consenting process. Up to now, the closest offshore developers have achieved in delivering a mitigation solution is by implementing interim solutions in the form of radar blanking and TMZs which permit wind farms to be operated pending development of an enduring radar solution. Implementation of a TMZ requires developers to enter the CAA's airspace change process as described for Civil ATC radar mitigation.

Military AD radar

50. The MoD ASACS organisation is responsible for compiling a Recognized Air Picture (RAPi) to monitor the airspace in and around the UK to launch a response to potential airborne threats. This is achieved through the utilisation of a network of long range radars positioned in various locations around the UK. AD radar resources are used in support of training exercises on an almost daily basis. AD units, using radar data supplied from the network of AD radars, are also responsible for navigation services and support to aircraft activity within restricted airspace within which promulgated activities include air combat training and supersonic flight.

51. Wind turbines within coverage of an AD radar could shield the radar from genuine aircraft targets and/or hide them from AD controllers. These direct and permanent effects would affect the controller's ability to provide a safe service to aircraft in support of training exercises and in using the radar data to monitor the UK RAPi.

52. At the time of writing this review in July 2022, MoD is considering its position on AD radar mitigation. The suitability of previously accepted 3-Dimensional Non-Automatic Initiation Zone (3-D NAIZ) technology, is now in doubt and MoD are conducting further analysis. It is widely accepted that this technology may not be available in the future. As no other technology has been accepted by MoD, developers are currently considering which technologies may be suitable going forward. A Joint MoD/Offshore Wind Industry Council (OWIC) Task Force was set up in 2019 and following initial Radar Concept Demonstrations in 2021 and the release of the jointly endorsed OWIC Strategy and Implementation Plan, further AD radar mitigation trials are expected in Financial Year 2022/2023 on potential solutions; however, this technology still needs to be fully proven. The Applicant is a funding member of OWIC which is working jointly with the MoD, BEIS, The Crown Estate and other developers to develop, assess and procure replacement/additional AD surveillance technology that shall mitigate the impact upon UK-based AD radars. In the interim, MoD has recently started accepting mitigation proposals for alternative technologies other than 3-D NAIZ which has allowed them to withdraw AD radar objections subject to agreement of a suitably worded suspensive planning condition); thereby, de-risking the consenting process.

Low flying (including SAR)

53. For military low flying, offshore wind farms 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 (2016): 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 2 nm 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 offshore wind farm (including OSPs/Offshore converter station platform) 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.

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

6. SUMMARY

55. This section provides a summary of the aviation, military and communications baseline characterisation and details the receptors to be considered in the EIA (volume 2, chapter 14) as informed by the baseline.

56. Based on the baseline characterisation and desktop study, the key aviation and military issues identified concern the potential impact of the Proposed Development on civilian and military radar systems. The interference (or "clutter") generated by the spinning blades of the turbines can desensitize radar in the area of the wind farm. This radar interference can hinder the detection of legitimate targets and therefore, operational safety. This review has determined that there are six potential ATC and AD radar systems that could be affected by the Proposed Development during its operational lifetime. The relevant radar systems are as follows:

- MoD Brizlee Wood AD radar;
- MoD Buchan AD radar;
- MoD Leuchars Station ATC radar;
- MoD Spadeadam Deadwater Fell ATC radar;
- NERL Allanshill ATC radar; and
- NERL Perwinnes ATC radar.

57. The potential for impacts on other forms of communication was discounted.

58. A summary of the potential effects of the Proposed Development on aviation and military receptors (and the potential need for mitigation to avoid or reduce these effects) is provided in Table 6.1.

Table 6.1: Summary of Potential Impacts on Aviation Receptors

Aviation criteria	Potential Risk	Potential Mitigation Requirements
Civil Airport Patterns and Procedures	No effect on this receptor.	None required.
Military Aerodrome Patterns and Procedures	No effect on this receptor.	None required.
Civil ATC Radar	Potential impact on NERL's Allanshill and Perwinnes PSRs. Aberdeen Airport and NERL likely to raise objections. Receptors able to continue operations with appropriate mitigation in place. Impact will be confirmed following consultation with NERL.	Mitigation available (e.g. Radar Blanking and TMZ). Requires negotiation with Aberdeen Airport and NERL.

Aviation criteria	Potential Risk	Potential Mitigation Requirements
Military ATC Radar	Potential impact on MoD Leuchars Station and Spadeadam Deadwater Fell PSRs. Objection from MoD expected. Receptors unable to continue safe operations or safe provision of air navigation services in the presence of the wind turbines.	MoD objection resolvable by consent condition following submission of a mitigation proposal.
Military AD Radar	Potential impact on Buchan and Brizlee Wood AD radars. Objection from MoD expected. Receptor unable to continue safe operations or safe provision of air navigation services in the presence of the wind turbines.	MoD objection resolvable by consent condition following submission of a mitigation proposal.
Low Flying (including SAR)	Objection from MoD or MCA not expected. Receptor able to continue operations with standard mitigation in place.	Aviation lighting will need to be installed to the satisfaction of the CAA, MoD and MCA.
HMRs	No effect on this receptor.	None required.
Offshore Helicopter Installations (oil and gas platforms)	No effect on this receptor.	None required.
Met Office Radar	No effect on this receptor.	None required.

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