14 Aviation, Radar and Telecommunication

Contents

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14 Aviation, Radar and Telecommunication

14.1 Executive Summary

14.1.1 An initial scoping study relating to aviation, radar and telecommunications identified those stakeholders potentially affected by the Proposed Development. The scoping process involved considering all military and civil aerodromes in the wider area out to circa 60 km, all radar installations out to the limit of their range, all navigational aids, air-ground-air communications stations and low flying activities, as well as operators of telecommunications links. The scoping process identified potential impacts to primary radars operated by NATS, Glasgow Airport and Glasgow Prestwick Airport. Additional analysis determined no impacts to the Glasgow Prestwick Airport radar.

14.1.2 Consultations were conducted with NATS, Glasgow Airport, Glasgow Prestwick Airport, Atkins, the Joint Radio Company (JRC) and Arqiva; additionally, the Ofcom online database of fixed links was interrogated to identify any links near the Proposed Development site (note that Ofcom no longer provides such information directly).

14.1.3 Potential impacts to the NATS and Glasgow Airport primary radars that were identified can be mitigated through the blanking of the affected radars and the provision of in-fill coverage from unaffected radar; commonly referred to as blanking and in-fill.

14.1.4 Two potential in-fill radars exist, both having been installed to mitigate wind farm impacts. These are the Terma radar at Glasgow Airport and the Sensis radar located at Kincardine. Dialogue continues with the stakeholders to determine the most appropriate in-fill radar. Mitigation Agreements with these organisations will be put in place, to allow their conditional approval of the Proposed Development.

14.1.5 It is anticipated that there will be no significant residual effects on aviation or telecommunication infrastructure as a result of the construction, operation and decommissioning of the Proposed Development.

14.2 Introduction

14.2.1 This chapter considers the potential effects of the Proposed Development on existing and planned military and civil aviation activities, television and telecommunications infrastructure.

14.2.2 Wind turbines are not directly subject to the Communications Act 2003 and require no authorisation from Ofcom in their management of the radio spectrum and granting of licenses under the Wireless Telegraphy Act. However, planning authorities do consider the potential impact of structures on existing communications infrastructure and they require that consideration of such impacts is made by wind energy developers.

14.2.3 Radio waves and microwaves are used in a variety of communications and any large structure has the potential to interfere with their reception. The magnitude of the impact from a new structure is principally dependent upon the size, shape and materials of construction. Wind turbines are very slender and the rotor is substantially constructed from non-conducting materials (Glass Reinforced Plastic), both of which reduce their potential for causing interference. However, the tower is usually steel and the rotor blades contain some conductive materials, for lightning conduction and in some cases structural carbon fibre. The blade movement may also have an effect on radars, which are designed to detect movement.

14.2.4 The potential effects on electromagnetic signals are highly dependent on the location of the wind farm and on the positions of the individual turbines. In some cases, there are no significant consequences and no mitigation is required, whilst in other cases the turbine specification or layout must be designed to accommodate local infrastructure. Mitigation is often available and appropriate to manage impacts on communications infrastructure or radar.

14.2.5 The key considerations for the Proposed Development are the potential effects on civil aviation and defence radar, microwave and ultra-high frequency (UHF) band communications and television broadcasting. An Electromagnetic Interference Survey (EMI) was undertaken to determine the suitability of the site and any mitigation measures required to overcome any identified potential effects. The EMI assessment was conducted through a combination of consultation with the operators of these systems where possible, with independent impact assessment where this is not possible.

14.3 Legislation, Policy and Guidelines

14.3.1 The relevant sections of key legislation, policy and guidance documents are described below, which together place a responsibility on the planning authorities and the developer to assess potential impacts on aviation and telecommunications links in particular.

Legislation

14.3.2 Civil Aviation Authority (CAA) CAP 393, The Air Navigation Order and Regulations (2016), specifies the statutory requirements for the lighting of onshore wind turbines over 150 m tall.

Policy

14.3.3 Chapter 5 of the EIA Report sets out the planning policy framework that is relevant to the EIA. The policies set out include those from the adopted Strategic Development Plan and Local Development Plan (LDP) that cover South Lanarkshire (2015), those relevant aspects of Scottish Planning Policy (SPP), National Planning Framework 3 (NPF3), Planning Advice Notes and other relevant guidance. Of relevance to the aviation, radar and telecommunications assessment presented within this chapter, regard has been given to the following policies.

Scottish Planning Policy (SPP), 2014

14.3.4 The SPP states under paragraph 169 on Development Management, that consideration should be given to the, "*impacts on aviation and defence interests and seismological recording;* [and] *impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised*".

14.3.5 It also highlights that *Planning Advice Note 62, Radio Telecommunications* provides advice on siting and design, as does the *Planning Circular 2/2003: Safeguarding of Aerodromes, Technical Sites and Military Explosives*.

Scottish Onshore Wind Policy Statement, December 2017

14.3.6 Under chapter 4, barriers to deployment, it is noted wind developments can impact significantly on civil air traffic control primary radar systems because they appear as clutter on radar displays, potentially obscuring aircraft flying above them from view. This is a common factor in creating delay and cost to wind power developments.

14.3.7 Paragraphs 61 to 65 in chapter 4, specifically address impacts to civil aviation radar, extracted below.

14.3.8 "The main mitigation method which has been deployed in numerous schemes over a number of years involves 'in-filling' from a radar which has no line of sight of the turbines in question.

14.3.9 While this is a proven mitigation (albeit not one that can be deployed for every development), the Scottish Government recognises that it can result in a significant financial burden, especially in cases where more than one in-fill feed is necessary. Since the financial environment facing wind energy development has changed radically, we believe that we need to reconsider this approach.

14.3.10 The Scottish Government remains committed to working with airports, radar operators and the wind industry in order to pursue and develop a more strategic approach to mitigating impacts of wind development on civil aviation radar.

14.3.11 Wind farms are no longer the new and unexpected feature that they once were and are an established part of Scotland's landscape. Given this, we expect in the longer term, a move on the part of the air navigation industry towards self-management of this issue. This could be achieved through the deployment of wind farm tolerant radar, or other technical solutions.

14.3.12 In the shorter term, we will support any strategic use of radar, with a special focus across the central belt, where there is potential to maximise the application of mitigation and reduce costs.

14.3.13 The Scottish Government will also continue to work as part of the UK Government Chaired Aviation Management Board (AMB), and as part of the Renewable UK Aviation Working Group to make progress on this issue".

Planning Circular 2/03 (revised March 2016): Safeguarding of Aerodromes, Technical Sites and Military Explosives Storage Areas

14.3.14 This Circular summarises the Scottish Ministers' understanding of the general effect of the relevant primary or secondary legislation.

14.3.15 It contains 4 Annexes. Annexes 1 and 2 describe the formal process by which planning authorities should take into account safeguarding, including in relation to wind energy developments. Annex 3 lists officially safeguarded civil aerodromes and Annex 4 lists planning authority areas containing civil en-route technical sites for which separate official safeguarding maps have been issued (as at 27 January 2003).

14.3.16 The circular also refers planning authorities, statutory consultees, developers and others to CAA CAP 764 (CAA Policy and Guidance on Wind Turbines), which is discussed further under Guidance below, and Met Office guidelines.

Planning Advice Note (PAN) 62: Radio Telecommunications

14.3.17 PAN 62 states that, "*Large and prominent structures such as tall buildings and wind farms can cause disruption to radio telecommunications services by obstructing or reflecting the signals. The Radiocommunications Agency (Now Ofcom) may be able to suggest engineering solutions to overcome the problem, such as installing repeaters. Planning authorities can grant planning permission for such prominent structures subject to a condition that before development commences the developer will propose measures by which the quality of reception affected by the proposal will be maintained*."

CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level (June 2017)

14.3.18 This policy statement highlights and clarifies the requirements set out in CAP393, the Air Navigation Order, for the lighting of onshore turbines. Key sections are described further under the assessment methodology below.

South Lanarkshire Local Development Plan (2015)

14.3.19 Policy 19 (Renewable Energy) of the LDP is relevant to the aviation, radar and telecommunication assessment.

SLC Supplementary Guidance 10 on Renewable Energy (2015)

14.3.20 SLC Supplementary Guidance 10 on Renewable Energy (2015) sets out policies and other advice in support of wind developments in South Lanarkshire. Paragraph 6.95 to 6.102 (Development Management Considerations) deals with aviation matters and states that "*the impacts of the proposal on radar performance, defence interests and other air safety and seismological recording considerations must be satisfactorily addressed and demonstrated to the satisfaction of the relevant technical authorities*" (paragraph 6.101).

14.3.21 Paragraphs 6.105 to 6.108 deal with matters relating to telecommunication and broadcasting installations and states, "*the siting of wind turbines must have regard to radio, television, telecoms and other communication systems particularly ensuring that transmission links are not compromised*" (paragraph 6.105).

14.3.22 Parts 15 and 16 of the assessment checklist (Table7.1) address aviation and telecommunication impacts and the requirement for them to be assessed within the Environmental Statement.

Guidance

14.3.23 CAA guidance, within CAP 764 (CAA Policy and Guidance on Wind Turbines), sets out recommended consultation and assessment criteria for the impacts of wind turbines on all aspects of civil aviation.

14.3.24 The CAA involvement in the Wind Farm Pre-Planning Consultation Process ceased on 25 December 2010. CAP 764 now states that "*developers are required to undertake their own pre- planning assessment of potential civil aviation related issues*."

14.3.25 Within CAP 764 the CAA provides a chapter describing the "*wind turbine development planning process*", within which the main civil aviation stakeholders and their interests are listed and described in brief. Table 1 within the guidance document provides an overview of considerations and the following paragraphs detail what developers will need to consider, conducting associated consultations as appropriate. The CAA observes in section 2.36 of CAP764 that impact on communications, navigation and surveillance infrastructure alone is not sufficient to support an objection; rather those impacts need to have a negative impact on the provision of an air traffic service.

14.3.26 The CAA notes in section 5.25 of CAP 764 that "*it is incumbent upon the developer to liaise with the appropriate aviation stakeholder to discuss – and hopefully resolve or mitigate – aviation related concerns without requiring further CAA input. However, if these discussions break down or an impasse is reached, the CAA can be asked to provide objective comment*".

14.3.27 Section 5.26 of CAP 764 states that "*the CAA will not provide comment on MoD objections or arguments unless such comments have been requested by the MoD*."

14.4 Consultation

14.4.1 The aviation stakeholders consulted as a part of the EIA were NATS (En Route) plc (NATS), Glasgow Airport and Glasgow Prestwick Airport (GPA) and the Ministry of Defence (MoD).

14.4.2 Relevant telecommunications and television broadcasting stakeholders were also consulted, as set out in Table 14.1 below. Table 14.1 provides a summary of all consultation responses received. Copies of relevant consultee communications are provided in Appendix 4.2: ECU Scoping Opinion and Appendix 4.3: Further Consultation.

Table 14.1 – Consultee Responses

Consultee	Response	Actions
NATS	NATS (En-route) Plc (NATS), was consulted through the scoping process and directly on 24 July 2020. NATS is expected to object to the development without mitigation. Discussions determined that mitigation was likely to be possible through the same means as is currently provided for the other wind energy developments in this area (Nutberry Hill, Galawhistle, Douglas West and Hagshaw Hill Repowering). An alternative infill solution, which is currently providing NATS with mitigation for a number of other windfarms, is also being assessed. It is anticipated that NATS will be in a position to withdraw its objection, subject to a suitably worded planning condition.	The assessment of, and contracting for, mitigation with NATS is ongoing. Two potential solutions have been identified and are the subject of ongoing feasibility checks. Subsequent to the formal approval of the technical solution, the Applicant will enter into a contract for mitigation. This will enable NATS to remove its objection fully, conditional upon the mitigation being implemented prior to turbine installation. Draft condition wording will be agreed with NATS and submitted to the Scottish Ministers.
Glasgow Airport	Glasgow Airport was consulted through the scoping process and directly on 24 July 2020. Glasgow Airport objected to the development without mitigation. The airport installed a turbine mitigating radar in June 2018 and this could provide mitigation for this project. In addition, the airport has another radar feed used to mitigate other wind farms at the airport since 2008, which is also capable of mitigating this wind farm's impacts.	The situation with Glasgow Airport is similar to that with NATS. NATS (Services) Limited (NSL), the unregulated sister company of NATS, provides the air traffic service at Glasgow Airport. NSL provides assessment and contracting services for the airport and is providing these elements for the airport in parallel with the NATS mitigation. The solution is essentially common in using blanking and in-fill from one of two candidate in-fill radars. Hence, the mitigation options have been identified and are the subject of ongoing feasibility checks to confirm acceptability. Subsequent to the formal approval of the technical solution, the Applicant will enter into a contract for mitigation. This will enable Glasgow Airport to remove its objection, conditional upon the mitigation being implemented prior to turbine installation. Draft condition wording will be agreed with the airport and submitted to the Scottish Ministers.

Consultee	Response	Actions
Glasgow Prestwick Airport	Glasgow Prestwick Airport (GPA) was consulted through the scoping process and directly on 24 July 2020. In their scoping response of 28 July 2020 GPA stated that they were unlikely to object to a formal application but noted that they may require an assessment to be undertaken of impacts to published Instrument Flight Procedures (IFP's).	No further action is required at this stage. The Applicant will respond to any request from GPA to conduct assessments of impacts to radar or Instrument Flight Procedures.
MoD	The Defence Infrastructure Organisation (DIO) was consulted through the scoping process, responding on 9 September 2020. The MOD has no concerns in relation to the proposal, subject to the provision of appropriate lighting.	The CAA requirements for visible spectrum lighting will fully meet the MOD lighting requirement. The periphery CAA lights will also contain an Infra-Red element so enabling MoD (and other) pilots equipped with night vision goggles to detect the lights. No other actions required.
Ofcom (via Spectrum Licensing) (licensee for all fixed links)	Ofcom no longer responds to consultation requests, however information on fixed links is available from Ofcom's online database[1]. The data files were downloaded on 21 October 2020 and interrogated using GIS. No fixed links were identified within 1 km of any proposed turbines.	No further action is required.
Joint Radio Company (JRC) (safeguarding communications for the electricity and gas utilities)	JRC responded on 28 September 2020 confirming that the proposal is cleared with respect to radio link infrastructure operated by ScottishPower and Scotia Gas Networks.	No further action is required.
Atkins (safeguarding communications for the water utilities)	Atkins responded on 30 September 2020 objecting to the Proposed Development as there is a risk that the proposed turbines would cause interference to the Dunside to Kilncadzow link, based on an 1800 m radius search area.	The Applicant would note that there are operational turbines within closer proximity to this link, therefore interference is unlikely. Further consultation has been undertaken with Atkins to request the objection is removed. Awaiting response.
Arqiva (Operator of the television broadcasting infrastructure)	Arqiva responded on 5 October 2020 confirming they have no objections to the Proposed Development.	No further action required.

[1] https://www.ofcom.org.uk/spectrum/information/spectrum-information-system-sis/spectrum-information-portal

14.5 Assessment Methodology

Aviation and radar

14.5.1 Ultimately the requirement for the Proposed Development to have no significant adverse effects on aviation is established through consultation with all relevant stakeholders within the consenting process. The task of the Applicant is to independently assess the potential effects and where significant adverse effects may occur, to enter a dialogue with the affected stakeholders prior to submission as far as is possible. Whilst the aim of this pre-submission dialogue is to enable the approval of all stakeholders, typically solutions are identified but do not reach full maturity in terms of the assessment by the stakeholders and the contracting of mitigation where required. The stakeholders consider dialogue a higher priority and more meaningful, once design iterations are completed and a live application exists.

14.5.2 An initial scoping study identified those stakeholders potentially affected by the Proposed Development. The scoping process involves considering all military and civil aerodromes in the wider area out to circa 60 km, all radar installations out to the limit of their range, all navigational aids, air-ground-air communications stations and low flying activities. The scoping process identified NATS, Glasgow Airport, GPA and the MoD as relevant stakeholders.

14.5.3 The principal sensitivity is the visibility of the turbines to those radars potentially affected. Because of this, studies have been conducted prior to submission to assess the visibility of the Proposed Development to all relevant radars in the area. These studies determined that at least some of the turbines are expected to be visible to the NATS primary surveillance radars at Lowther Hill and Cumbernauld and to the Glasgow Airport primary surveillance radar. Impacts to secondary surveillance radar are not expected to be significant at this range and location.

14.5.4 The site is sufficiently remote from all aerodromes not to be considered as a physical obstruction.

14.5.5 As structures over 150 m high there is a statutory requirement for aviation lighting on the Proposed Development. The precise details of the lighting will need to be agreed with the CAA prior to construction. The requirements for the lighting of en–route obstacles (i.e. those away from the vicinity of a licensed aerodrome) are set out in Article 222 of the UK Air Navigation Order (ANO) 2016 as modified by the June 2017 CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level. Article 222 requires medium intensity (2000 candela) steady red aviation warning lights to be mounted as close as possible to the top of all structures at or above 150 m above ground level (AGL) and illuminated at night. In terms of requirement for lighting wind turbines generators, the CAA interprets this as the fitting of lights on the top of the supporting structure (the nacelle) rather than the blade tips. Additionally, the 2017 Policy Statement requires at least three (to provide 360-degree coverage) low-intensity lights (32 candela) be provided at an intermediate level of half the nacelle height. The lights should be turned on only when illuminance reaching a vertical surface falls below 500 LUX (dusk like conditions). If the horizontal meteorological visibility in all directions from every wind turbine generator in the Proposed Development is more than 5 km, the intensity of the nacelle mounted lights may be reduced to not less than 10% of the minimum peak intensity specified for a light of this type. The Applicant proposes taking advantage of this dimming functionality by installing sufficient visibility sensors. If four or more wind turbine generators are located together in the same group, with the permission of the CAA, only those on the periphery of the group need be fitted with a light.

14.5.6 Dialogue with NATS and Glasgow Airport is ongoing, with mitigation identified and approval anticipated in due course in both cases.

Telecommunications

14.5.7 Interference with mobile phone networks and other wireless data networks can occur through the interference of microwave and UHF band fixed links. These are operated by or on the behalf of the mobile service providers, the utility companies, the emergency services and occasionally by small private networks.

14.5.8 The impact assessment has been conducted through consultation with the operators of these systems. Ofcom (via Spectrum Licensing) manages the allocation of frequencies and holds a database of licensed links. The database is available online for interrogation to identify fixed links for any given area. Ofcom does not comment on impacts or consider mitigation, which must be conducted in direct discussions with the system operators if links are identified.

Television

14.5.9 Terrestrial television services within the United Kingdom are the joint responsibility of the BBC and Ofcom. The transmission network is provided and operated on behalf of the broadcaster Arqiva. With television broadcasting now having completed the conversion to a digital only service, only potential effects on the digital system need be considered.

14.5.10 Written consultation is required with the network operator Arqiva to address potential impacts on the television infrastructure. Consultation with Arqiva covers all the elements of the television broadcast infrastructure, with the exception of domestic television reception. Arqiva has confirmed that the development will not affect any of its microwave links. Arqiva does not provide assessment of potential impacts on digital television reception (refer to Table 14.1 above).

14.5.11 Potential effects on domestic television reception are assessed by consideration of the geography and topology of the local conurbations, the transmitter network, the off-air signal strength and the terrain.

14.5.12 The potential for negative effects on domestic television reception are greatly diminished post digital switchover. Currently there is no widely accepted method of determining the potential effects of wind turbines on digital reception. However, it is documented that digital television signals are much better at coping with signal reflections and digital television pictures do not suffer from ghosting. Digital transmitter powers increased to around ten times previous levels at digital switchover. At the same time digital signals were added to the relay transmitter network. These improvements greatly increased the availability and robustness of digital terrestrial reception. Since digital switch over, there are very few known cases of wind turbine interference with domestic television reception.

14.6 Baseline Conditions

Aviation

14.6.1 No aerodromes have the potential to be affected by the Proposed Development. No military radars have the potential to be affected by the Proposed Development. No weather radars, Navigational Aids or Air-Ground-Air communication stations have the potential to be affected by the Proposed Development.

14.6.2 Impacts on the NATS Lowther Hill and Cumbernauld primary radars are anticipated, which if unmitigated are unacceptable to NATS.

14.6.3 Impacts on the Glasgow Airport primary radar are anticipated, which if unmitigated are unacceptable to the airport.

14.6.4 No impacts to GPA are anticipated.

14.6.5 No MoD objection is expected. The MoD has requested aviation lighting, but as this is a statutory requirement in any event, this requirement will be met, and the Applicant will ensure that relevant periphery lights have an Infra-Red component as well as the visible light.

Telecommunications

14.6.6 The baseline was established by review of Ofcom's downloadable database of fixed links, and consultation with JRC on behalf of the electricity and gas utilities, Atkins on behalf of water utilities and Arqiva on behalf of radio transmission links and rebroadcasting links.

14.6.7 The consultation responses are detailed in Table 14.1 above. Atkins identified that there is a risk that the proposed turbines would cause interference to the Dunside to Kilncadzow link, based on an 1800m radius search area. The consultation process with JRC, Arqiva and review of the Ofcom database identified no infrastructure to be sufficiently close to the Proposed Development to be affected.

Television

14.6.8 The baseline for potential impacts on television interests comprises two elements, broadcast infrastructure and domestic reception.

14.6.9 Post digital switchover impacts on domestic television reception are rare. Arqiva does not assess these impacts and the BBC does not provide a tool for the assessment of impacts to digital television reception. The impacts were therefore considered independently. Since 2012, the UK has been fully switched over to digital television from terrestrial signals. Digital television signals are much better at coping with signal reflections than analogue.

14.6.10 The nearest transmitters have been identified[2] and the transmission between them, the Proposed Development and residential properties has been considered. The nearest properties are primarily serviced by the transmitter at Black Hill to the north, Muirkirk to the south, Darvel to the west or Biggar to the east. The Proposed Development does not sit between the residential properties and the transmitter they receive signal from; therefore, interference is unlikely.

14.6.11 There are to date, no known cases of wind turbine interference with digital television, and it is therefore considered there is a low risk of any interference from the Proposed Development on domestic television reception.

14.6.12 Therefore, potential effects on digital television are given no further consideration within this assessment.

14.7 Potential Effects

Construction

14.7.1 No EMI effects are anticipated to occur during construction of the Proposed Development. Given that any occurrence of EMI effect during the short commissioning period would replicate itself during operation of the Proposed Development, it is considered appropriate to consider the commissioning activities as part of the operational stage of the development.

[2] https://www.bbc.co.uk/reception/check-for-transmitter-faults/

Operation

Aviation

14.7.2 There is potential for major adverse (significant) effects on aviation interests during the operational phase of the Proposed Development, in the absence of mitigation.

14.7.3 The Applicant accepts the need to mitigate the impacts on the NATS radars at Lowther Hill and Cumbernauld and any associated planning conditions.

14.7.4 Similarly, the Applicant accepts the need to mitigate the impacts on the Glasgow Airport radar and any associated planning conditions.

Telecommunications

14.7.5 Based on the review of the Ofcom database and direct consultation with link operators, the only potential impact is possible interference on the Dunside link identified by Atkins within 1800 m. The Applicant has engaged with Atkins to request they remove this objection as it is noted there are operational turbines at Auchrobert Wind Farm within closer proximity to the link path than the proposed turbines, as detailed below:

- Approximate distance from Proposed Development turbine to fixed link: 1587 m
- Approximate distance from Auchrobert turbine to fixed link: 280 m

14.7.6 It is therefore considered that the risk of interference from the Proposed Development on this link is low and can be removed through further consultation with Atkins. The impacts are therefore anticipated to be negligible.

14.7.7 No further impacts or effects upon fixed links are anticipated as a result of the Proposed Development.

Decommissioning

14.7.8 No EMI effects are anticipated to occur during the decommissioning of the Proposed Development. Radar impacts cease when the rotors stop rotating. Other impacts associated with the physical presence of the structures and cranes replicate operational impacts. Cranes and turbines will be lit as appropriate to continue to mitigate aviation risks.

14.8 Mitigation

Aviation

14.8.1 The impacts on the NATS primary radars will be mitigated through the blanking of the affected radars and the provision of in-fill coverage from one of two unaffected radar currently available to NATS (subject to the agreement of contractual arrangements).

14.8.2 The impacts on the Glasgow main primary radar will be mitigated through the blanking of the radar and the provision of in-fill coverage from one of two unaffected radar currently available to Glasgow Airport (subject to the agreement of contractual arrangements).

14.8.3 The Proposed Development will have aviation lighting to mark it as an en-route obstacle to low flying aircraft. The lighting requirements will be agreed with the CAA, with the lights meeting the requirements set out in in Article 222 of the UK Air Navigation Order (ANO). It is anticipated that approximately seventeen turbines will be lit (refer to Appendix 6.4: Lighting Assessment), marking the development periphery and the highest point.

14.8.4 It should be noted that the proposed lighting plan is indicative and subject to further discussion and agreement with the CAA once consent is established. At the relevant time, in the light of all consented projects in this area, the developer and the CAA may wish to adopt a holistic approach with regards to aviation lighting across this and other nearby wind farm projects.

Telecommunications

14.8.5 As noted in Section 14.7.5 above it is anticipated that the Applicant will undertake further consultation with Atkins to resolve any outstanding concerns with the Dunside fixed link.

14.9 Residual Effects

14.9.1 There will be no residual effects during the construction or decommissioning phases of the Proposed Development with respect to aviation, radar and telecommunications.

14.9.2 Following implementation of appropriate mitigation with respect to NATS and Glasgow Airport radar concerns, there will be no residual effects on aviation, radar and telecommunication infrastructure during the operation of the Proposed Development.

14.10 Cumulative Assessment

14.10.1 It is considered that as none of the consented wind farm developments have significant residual effects on aviation, radar or telecommunication interests, the potential for cumulative effects is negligible.

14.10.2 Therefore, it is considered that there will be no significant cumulative effects on aviation, radar or telecommunication interests as a result of the Proposed Development.

14.11 Summary

14.11.1 This chapter has considered the potential effects of the Proposed Development on existing and planned military and civil aviation activities, television and telecommunications infrastructure.

14.11.2 Consultations have been conducted with Ofcom (via review of its online database), JRC, Atkins, Arqiva, MOD, NATS, Glasgow Airport and Glasgow Prestwick Airport.

14.11.3 Impacts were identified on NATS and Glasgow Airport primary radars. Mitigation schemes have been identified to fully meet the requirements of these stakeholders, with no residual effects. Contracts will be entered into such that NATS and Glasgow Airport can provide their approval, conditional upon the implementation of the mitigation schemes prior to turbine erection.

14.11.4 No effects were identified on telecommunications or television broadcasting infrastructure, summarised in Table 14.2 below.

Table 14.2 – Summary Table

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Effects on aviation, radar and telecommunication interests during construction and decommissioning	Negligible	Neutral	Aviation lighting will be installed as soon as practicable on erected turbines.	Negligible	Neutral
Effects on MoD low flying interests during the operational period	Negligible	Neutral	Aviation lighting will be installed. The location of erected turbines will be notified to the CAA and Defence Geographic Centre for inclusion in relevant obstacles data bases and the ENR5.4.	Negligible	Neutral
Effects on NATS infrastructure during the operational period	Major	Adverse	Mitigation measure agreed between the Applicant and NATS	Negligible	Neutral
Effects on Glasgow Airport infrastructure during the operational period	Major	Adverse	Mitigation measure agreed between the Applicant and Glasgow Airport	Negligible	Neutral
Effects on telecommunications fixed links	Negligible	Neutral	Further consultation undertaken with Atkins	Negligible	Neutral

14.12 References

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Civil Aviation Authority (Jun 2017). Policy Statement - Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level

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