14 Aviation and Radar

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14 Aviation and Radar

14.1 Executive Summary

14.1.1 The assessment of aviation and radar involves considering all military and civil aerodromes in the wider area out to circa 30 km, all radar installations out to the limit of their range, all navigational aids, air-ground-air communications stations and low flying activities.

14.1.2 Consultations were conducted with NATS, Highlands and Islands Airports Ltd (HIAL), Orkney Islands Council Airfields, Kirkwall Airport and the Ministry of Defence (MoD).

14.1.3 No objections were received from NATS, HIAL and Orkney Islands Council Airfields.

14.1.4 The Kirkwall Senior Pilot for Loganair did not object but requested daytime only red aviation lighting, as mitigation for low flying under conditions of reduced visibility.

14.1.5 Aviation obstruction lighting will be fitted, the final specification to be agreed with the CAA and Loganair. The Environmental Impact Assessment (EIA) has been assessed on the basis of steady red medium intensity light with the intensity being able to be reduced to 10 % in conditions of good visibility. Recommended lighting also reduces in intensity below the horizontal to minimise the downward spillage of light.

14.1.6 The MOD did not object but noted that the Proposed Development may have an impact on low flying operations. MOD scoping responses are based on generic mapping with no project specific assessment having been conducted. The assessment conducted in the impact assessment has determined that at full application there will be no low flying objection.

14.1.7 In addition, the MOD considered it probable that it would request MOD accredited visible or infrared aviation safety lighting to operate from dusk till dawn. This requirement will be met with infrared lights fitted to every turbine nacelle. This lighting will not be visible to the human eye.

14.1.8 Following implementation of the required mitigation outlined above, it is concluded that there will be no significant residual effects on aviation or radar as a result 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, including those resulting from impacts to radar. Other potential effects result from the physical presence of the turbines as obstacles and effects on navigational and air-ground-air communications stations are also considered.

14.2.2 Following a summary of relevant policy and legislation, this chapter describes the consultations conducted, the assessment methodology that has been adopted, the overall baseline conditions and associated mitigation requirements. The chapter concludes with a description of residual effects and a summary.

14.2.3 Radio waves are used in a variety of surveillance and communication systems within aviation and any large structure has the potential to interfere with their broadcast and reception. The potential of a structure to affect the propagation of radio waves 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 the potential for turbines to cause 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. Because the blades rotate, this can cause turbines to show up on radar, which are specifically designed to detect movement.

14.2.4 The potential effects 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. In the

extreme, sites can be considered inappropriate for wind energy development where no mitigation is considered fully effective.

Statement of Competence

14.2.5 The assessment has been carried out by Ian Fletcher (BEng, IMechE) of Wind Business Support, an aviation specialist who has been advising on aviation and radar impacts for 21 years.

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 Applicant to assess potential impacts on aviation.

Legislation

14.3.2 There is a statutory requirement for the lighting of onshore wind turbines over 150 m tall, specified in the Civil Aviation Authority (CAA) CAP 393, The Air Navigation Order and Regulations. The Proposed Development is under 150 m tall and hence this statutory requirement does not apply.

Policy

14.3.3 Policies include those relevant aspects of Scottish Planning Policy (SPP), Planning Advice Notes and other relevant guidance. Of relevance to the aviation and radar 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*".

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

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

14.3.6 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).

14.3.7 The circular 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.

14.3.8 The circular also refers them to the interim guidelines, Wind Energy and Aviation Interests – Interim Guidelines, published by the Department of Trade and Industry in 2002. Whilst still of some relevance, the advice here has largely been superseded.

Guidance

14.3.9 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.

14.3.10 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*."

14.3.11 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.

14.3.12 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*".

14.3.13 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 process were NATS, HIAL, Orkney Islands Council Airfields, Kirkwall Airport and the MoD. Table 14.1 provides a summary of all consultation responses received.

Table 14.1 – Consultation Responses

Consultee	Response	Actions
NATS (En Route) Plc	No Objection.	No action required.
Orkney Islands Council Airfields	No Objection.	No action required.
Kirkwall Airport (Loganair chief pilot)	No objection. Request for red aviation safety lighting.	Daytime only red aviation lighting to be fitted, dimmable under conditions of good (5 km+) visibility.
MoD	No Objection. May have concerns in relation to low flying. Request for Infra-Red (IR) or low intensity visible lighting.	Turbines to be fitted with infra-red lighting to provide night time visibility for military aircraft. No issue with low flying expected.
Highlands and Islands Airports Ltd	No objection. The initial concerns over potential impact to future surveillance systems were removed in August 2020.	No action required.

14.5 Assessment Methodology

14.5.1 The requirement for the Proposed Development to have no significant effects on aviation is addressed 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 effects may occur, to enter a dialogue with the affected stakeholders prior to submission as far as is possible.

14.5.2 Wind turbines can have an impact on flying simply by virtue of their physical presence. In this respect they are no different to any other tall obstacles such as pylons or television masts, with recognised criteria for safeguarding the airspace around airfields. Away from airfields, such obstacles are a

normal part of the aviation scenery and measures are in place to enable aircraft to safely navigate around them.

14.5.3 The assessment process involves considering all military and civil aerodromes in the wider area out to circa 30 km, all radar installations out to the limit of their range, all navigational aids, air-ground-air communications stations and low flying activities.

14.5.4 The study considered the visibility of the Proposed Development to primary surveillance radars, secondary surveillance radars, weather radars, precision approach radars, en-route radars and air defence radars. These are used by aerodromes, NATS and by the MoD. A network of 12 radars within the UK are used by the Met Office to monitor the weather.

14.5.5 The baseline assessment identified NATS, HIAL/Kirkwall Airport, OIC Airfields and the MoD as relevant stakeholders and consultation has been undertaken with them as per Table 14.1.

14.6 Baseline Conditions

14.6.1 The London airport main runway reference point on the Isle of Eday lies at a range of 3.3 km from the nearest turbine. This is a licensed aerodrome with two short runways oriented away from the Proposed Development. The Airfield Superintendent of the Orkney Islands Council Airfields, responsible for the safeguarding of all the Council operated airfields including London, has raised no objection to the proposal.

14.6.2 The nearest turbine at the site lies 23.5 km from the main runway reference point (the centre) of Kirkwall Airport, with that airport requiring detailed consideration. No other active aerodromes or private air strips were found to be sufficiently close to require consideration. The site lies beyond the safeguarding limits for air-ground-air communication stations and navigational aids. It is located within a low priority military low fly zone.

14.6.3 The Proposed Development is not visible to any aviation or met office radar.

Kirkwall Airport

14.6.4 HIAL removed all objections in August 2020 (refer to Appendix 4.4). This position reflects the independent impact assessment of the effects on existing infrastructure and operations, also finding no impacts. The interests of Kirkwall Airport are fully represented by HIAL, as the operator of the airport.

14.6.5 Typically, the airport operator would be expected to consult with its users in generating its own response. In this case the chief pilot of Loganair, the main commercial user of the airport, was additionally consulted directly, raising no objection but requesting day time aviation lighting.

14.6.6 There was a direct dialogue with the Loganair chief pilot to determine an appropriate specification for the requested aviation lighting. It was agreed that this should match the lighting used on the Sanday turbines. These are medium intensity steady red lights of minimum intensity 2000 cd. It was further agreed that, in accordance with CAA policy, the lights could be dimmed to 10 % of their minimum intensity (200 cd) in conditions of high visibility. This can be achieved automatically with turbine mounted sensors, measuring both visibility and light levels for daylight hours use only.

14.6.7 In addition to the reduction of intensity under conditions of good visibility, the intensity also reduces sharply when observed from beneath the light, with reference to the horizontal. At -1 degree the intensity recommended by the CAA (via ICOA Annex 14 Volume 1 to the Chicago Convention) should not exceed 56 % of the maximum intensity, falling to 4 % at -10 degrees.

MOD

14.6.8 The MOD has no objection to the Proposed Development. It noted that it may have concerns related to low flying. The low flying position is based on generic mapping with no project specific assessment having been conducted by the relevant MOD expert at the scoping stage. The site is within a large area mapped as low priority for military low flying. Areas defined as low priority generate the standard response given at the scoping and pre-application inquiry stage. In practice such areas have not generated objections at the full application stage and there are no apparent military low

flying activities in this area that would generate an objection. It is therefore anticipated that there will be no low flying objection in response to the full application.

14.6.9 Aviation lighting was requested; to comprise of either infra-red (IR) or low intensity visible spectrum red lighting day and night. To meet this requirement, in addition to the daytime lighting required by Kirkwall Airport, infra-red lighting will be fitted to every turbine nacelle. This lighting will not be visible to the human eye.

14.6.10 No other issues were raised.

14.7 Mitigation

14.7.1 Medium intensity fixed red LED obstruction lights (2000 cd) on every turbine; daylight hours only. The intensity can be reduced in conditions of high visibility. If the horizontal meteorological visibility in all directions from every wind turbine generator is more than 5 km, the intensity for the light may be reduced to not less than 10 % of the minimum peak intensity; i.e. 200 cd. The intensity of the light reduces sharply below the horizontal

14.7.2 The lighting specified to suppliers will meet CAA and ICOA lighting requirements for medium intensity obstruction lighting.

14.7.3 The MOD request for aviation lighting will be met with the installation of IR lighting on every turbine. The MOD specifies the lighting requirement. This specification will be stipulated to suppliers to ensure appropriate lighting is fitted.

14.7.4 There are no other mitigation requirements from the MOD, HIAL, the CAA or NATS.

14.8 Likely Effects

14.8.1 No aviation or radar effects are anticipated during construction or operation.

14.8.2 The Applicant is seeking in-perpetuity consent for the Proposed Development. In the event of decommissioning, or replacement of turbines, it is anticipated that the levels of effect would be similar but of a lesser level than those during construction (i.e. no effects on aviation or radar). Decommissioning would be undertaken in line with best practice processes and methods at that time and will be managed through an agreed Decommissioning Environmental Management Plan.

14.9 Additional Mitigation and Enhancement

14.9.1 No additional mitigation or enhancement is required.

14.10 Residual Effects

14.10.1 There will be no residual effects from the Proposed Development with respect to aviation or radar.

14.11 Cumulative Assessment

14.11.1 It is considered that, as the Proposed Development will have no significant residual effects on aviation or radar interests, there will be no cumulative effects. Note that stakeholders take into account cumulative impacts in their responses.

14.12 Summary

14.12.1 No objections were received from the MOD, NATS, HIAL and Orkney Islands Council Airfields.

14.12.2 The MOD noted that low flying may be a concern, ahead of a detailed assessment by their subject matter expert. Having considered the site specifics no objection is expected, but the requirement for lighting is very likely to be retained and hence IR lighting is specified.

14.12.3 The Kirkwall Senior Pilot for Loganair requested red day time only aviation lighting, as mitigation for flying low under conditions of reduced visibility.

14.12.4 The MOD requested lighting, which will be realised as infra-red lighting fitted to every turbine nacelle. This lighting will not be visible to the human eye.

14.12.5 Following implementation of the required mitigation outlined above, it is concluded that there will be no significant residual effects on aviation or radar as a result of the Proposed Development

14.13 References

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