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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED DREHID WIND FARM AND SUBSTATION, CO. KILDARE

VOLUME 2- MAIN EIAR

CHAPTER 16: TELECOMMUNCATIONS AND AVIATION

Prepared for:

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16. TELECOMMUNICATION AND AVIATION

16.1 Introduction

This Chapter describes telecommunications and aviation factors that might potentially be affected by the Proposed Development. Where necessary, the potential impacts have been separated into the potential impacts associated with the Proposed Wind Farm and the potential impacts associated with the Proposed Substation.

The potential effects of the Proposed Development are initially considered without mitigation and the residual effects post mitigation are described. The assessment considers the potential effects during all phases of the development: construction, operation and decommissioning.

A full description of the Proposed Development assessed in this EIAR is provided in Chapter 3 - Description of the Proposed Development and comprises the following elements:

- The 'Proposed Wind Farm' (consisting of 11 turbines, turbine foundations and hardstanding areas, new access tracks, underground electrical and communications cabling, drainage, temporary site compounds and associated works; The Proposed Wind Farm also includes the 'Proposed Recreation and Amenity Trail');
- The 'Proposed Substation' (110 kV substation and loop-in connection to the existing overhead lines);
- Turbine delivery route (TDR).

The general layouts of the Proposed Wind Farm, the Proposed Substation are presented in Figure 3.3.

This assessment considers a single turbine model which has been selected for the project as described in section Chapter 3 - Description of the Proposed Development. The plans and particulars submitted with this application for consent are precise and provide specific dimensions for the turbine structures. The Proposed Wind Farm consists of the erection of 11 x Nordex 133 wind turbines. One turbine (T1) will have a tip height of 147.9 m, with the remaining 10 turbines having tip heights of 167 m. Alongside the wind turbines, the Proposed Wind Farm consists of access tracks, temporary compounds as well as temporary minor alterations to the public road for the delivery of turbines to the site (turbine delivery route). The Proposed Wind Farm will connect to the national grid via the Proposed Substation, as described in Chapter 3.

16.1.1 Study Area

The study area for Telecoms and Aviation is defined by the closest aviation and telecom assets to the site. And is not confined to a particular spatial study area.

16.2 Statement of Authority

This chapter has been prepared by Brian Cronin of Fehily Timoney and Company. Brian is a Senior Environmental Scientist with a BSc in Environmental Science from University College Cork and an MSc in Environmental Engineering from Trinity College Dublin. He is a member of the Institution of Engineers Ireland (MIEI). Brian has experience working on various renewable energy projects, preparing EIAR chapters for wind farm projects.

The Aviation Impact Assessment (AIA) was carried out by an experienced aviation consultant, Mr. John van Hoogstraten Managing Director of Straten Consulting Services Limited (Straten CSL), to undertake an assessment of the Proposed Development and assess the potential for impact on aviation operations in proximity. Straten CSL has extensive experience in Ireland, United Kingdom, France and Morocco conducting aviation feasibility and environmental impact assessments for proposed renewable energy developments.

16.3 Telecommunication Impact Assessment

16.3.1 Methodology

This section presents the methodology used in assessing the potential impact from the Proposed Development on local telecommunications services. The following sources of information were considered in this assessment:

- The design layout of the Proposed Development;
- Published literature as described below;
- A desk-based assessment of the existing telecommunications network.

The following assessment methodology was applied in this assessment:

- Wide ranging consultation with all known telecommunications operators (TO's) that could potentially be affected by the Proposed Development;
- Comprehensive data gathering exercise to establish all known telecommunications links in the area;
- Preparation of constraint mapping using data collected from the TO's, to identify turbines within specified separation distance from existing telecommunications links and masts;
- Preliminary Telecommunications Impact Assessment (TIA) including the following:
    - Design review to relocate turbines away from existing telecommunications services, where possible;
    - Further consultation with affected TO's to discuss residual impacts, identify critical telecommunications links and agree mitigation strategy;
    - Finalise turbine layout avoiding critical telecommunications links and incorporate concerns raised by the TO's;
    - Review of Turbine Delivery Route for potential impact on telecommunication .
- Undertaking by the Developer to implement an appropriate mitigation strategy, in conjunction with the relevant TO, to eliminate any anticipated or residual impacts.

16.3.1.1 Background and Potential Effects

16.3.1.1.1 Electromagnetic Interference

In the context of wind farm development, electromagnetic interference of a wind farm on existing telecommunication services can result in an unacceptable negative effect. The rotating blades of a wind turbine can occasionally cause interference to electro-magnetically propagated signals.

Not all signals are affected in the same way and some signals are more robust than others, however, such interference could, in theory, affect all forms of electromagnetic communications including:

- Satellite communications;
- RADAR;
- Cellular radio communications;
- Aircraft instrument landing systems;
- Air traffic control;
- Terrestrial telecommunication links; and
- Television broadcasts.

For the purposes of the telecommunications impact assessment, point-to-point and point-to-multipoint signals are considered. Both are used extensively throughout Ireland.

Point-to-point (or line of sight) is a wireless telecommunications transmission link between two nodes located at specified fixed points.

The term telecommunications link relates to the wireless transmission of data via radio frequencies between two fixed points. Telecommunications towers are generally used to transmit and receive signals over large distances. Radio frequency bands above 1 GHz are referred to as microwave radio links and are commonly used by telecommunications operators. These links are used mainly by mobile phone operators, broadcasters and utilities or emergency service providers, to provide transmission networks that are flexible and cost effective.

Point-to-multipoint refers to the situation where a central node transmits to, and receives from, a number of independent locations. This includes television and radio broadcasting and reception, mobile phones (to the mobile phone mast) and land mobile systems. It is possible that houses in the immediate vicinity of turbines could require some remedial measures in relation to television reception.

Section 5.10 of the DoEHLG Planning Guidelines on Wind Energy Developments (2006) [the Guidelines] states that:

> *"Wind turbines, like all electrical equipment, produce electromagnetic radiation, and this can interfere with broadcast communications. The interference with broadcast communication can be overcome by the installation of deflectors or repeaters. Planning authorities should advise the developer to contact the individual broadcasters, both national and local, and inform them of the proposals. A list of the licensed operators is available on the ComReg website at www.comreg.ie. Mobile phone operators should also be advised of the proposed development."*

Section 7.15 of these guidelines state:

> *"Conditions regarding measures to be taken to minimise interference with the transmission of radio and television signals, air and sea transport communications and other transmissions systems in the area may be necessary. Where electromagnetic interference is difficult to predict, conditions may require the developer to consult with the service provider concerned and undertake remedial works to rectify any interference caused."*

Additionally, Section 4.9.3 on Interference with Communication Systems of the Draft Wind Energy Guidelines (2019) states the following:

'Wind turbines, like all electrical equipment, produce electro- magnetic radiation, and this can interfere with broadcast communications. The interference with broadcast communication can often be overcome by the installation of deflectors or repeaters, however the layout and design of the wind energy development should take into account nearby telecommunications links.

'Planning authorities should advise the developer to contact the individual telecommunications providers, both national and local, to inform them of the proposals. A list of the licensed operators is available on the Broadcasting Authority of Ireland website at www.bai.ie. Mobile phone operators should also be advised of the proposed development. Contact details will need to be checked, as the telecommunications market is subject to change and there are new service providers emerging frequently'.

The telecommunications network is constantly evolving and the potential impact of the Proposed Development on local telecommunications signals is difficult to accurately predict for the following reasons:

- The network topology is likely to change significantly over time as a result of technological advances including migration towards 4G and the emerging 5G networks;
- Network operators are beginning to share services and consolidate the existing network which is likely to lead to an increase in the number of redundant and decommissioned services

A key objective of the assessment process is to identify turbines in close proximity to existing masts and telecommunication links with a view to relocating turbines that could potentially impact on local telecommunication operations. If a turbine could not be relocated due to other site constraints, further consultation was carried out with the affected TO's to consider the potential impact and agree an appropriate mitigation strategy if required. On that basis, obtaining the cooperation of the TO's was a key aspect of the process to enable the wind farm to be developed without adversely affecting existing telecommunications services.

It is possible that telecommunication services in the immediate vicinity of the turbines could require mitigation measures to negate any potential impact. Accordingly, the Developer has given an undertaking to cover the cost of implementing the necessary mitigation measures to prevent any degradation of service that is currently provided, should the result of a more detailed pre-construction study establish their necessity.

16.3.1.1.2 Broadcast Communications

Wind turbines as with any other large structure, have the potential to interfere with broadcast signals by acting as a physical barrier or causing a degree of interference to microwave links. The most significant effect at a domestic level relates to a possible flicker effect caused by the moving rotor, affecting, for example, radio signals. The most significant potential effect occurs where the wind farm is directly in line with the transmitter radio path. Interferences to mobile radio services is usually negligible, especially with increased distance between turbines and receivers.

16.3.1.1.3 Domestic Receivers

Depending on local topography, a domestic receiver may receive broadcast signals from more than one location. The strength of the signals varies with distance from the transmitter, and the receiver's antenna is generally directed towards the most local, and usually strongest, broadcasting station.

There are two types of potential electromagnetic interference to domestic receivers, depending on the location of the receiver in relation to a wind farm. 'Shadowed' houses are located directly behind a wind farm, relative to the location from where the signal is being received. In this case, as the main signal passes through the wind farm the rotating blades can create a degree of signal scattering. In the case of viewers located beside the wind farm (relative to the broadcast signal direction), the effects are likely to be due to periodic reflections from the blade, giving rise to a delayed signal.

In both cases, i.e. shadowed houses located behind the wind farm and those located to the side of it, the effects of electromagnetic interference may depend to some degree on the wind direction, since the plane of rotation of the rotor will affect both the line-of-sight blockage to viewers located behind the wind farm and the degree of reflection to receivers located to the side.

16.3.1.1.4 Other Signal Types

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example tower-to-tower microwave communication links, and airborne and ground radar systems. This is considered further in the Aviation section below.

16.3.1.1.5 Relevant Guidance - Telecommunications

A review of relevant policy and guidance documents was undertaken to identify relevant objectives relating to telecommunication and broadcasting. The following documents have been reviewed:

- 'Wind Energy Development Planning Guidelines' (WEG2006), published by the Department of the Environment, Heritage and Local Government (2006).
- 'Best Practice Guidelines for the Irish Wind Energy Industry', published by the Irish Wind Energy Association (2012).
- 'Tall structures and their impact on broadcast and other wireless services', published by Ofcom, a regulatory body independent from UK Government (2009).
- 'RF Measurement Assessment of Potential Wind Farm Interference to Fixed Links and Scanning Telemetry Devices', published by ERA Technology Ltd on behalf of Ofcom (2009).
- Kildare County Development 2023 - 2029

16.3.2 Scoping and Consultation

In line with the Planning and Best Practice Guidelines, consultation was undertaken to provide information on the Proposed Development to all relevant telecommunications service providers to discuss concerns and the potential benefits of the Proposed Development.

A Scoping Report was sent as part of this consultation in 2018, for an earlier design iteration of the Proposed Development. An updated letter was sent to consultees in 2024 to inform them of the latest iteration of the Proposed Development, which included the 11-turbine Proposed Wind Farm and the 110 kV Proposed Substation as presented in Figure 3-3 in Chapter 3.

The service providers were provided with the locations and dimensions of the proposed turbines and asked to advise whether any impact could occur to their networks.

The responses received from the telecommunications, broadcasters are summarised in Table 16.1 below and copy of correspondence is included in Appendix 16.2.

Table 16-1: Telecommunications and Aviation Scoping Consultees

Telecoms/Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
2RN	N/A	-	13th May 2024	2RN responded to say that they will require an agreement is signed between the developer and 2RN. An agreement had already been signed in 2018. 2RN responded with an updated agreement, which has since been signed.	New agreement signed between the Applicant and 2RN.
An Garda Síochana Telecommunications	N/A	No response to date	18th June 2024	Response from An Garda Síochana Telecommunications confirmed that the closest site of concern to them is Cappagh. At 7 km distance, this stakeholder was satisfied that the Proposed Development would not have potential effects on their telecoms network.	No potential impacts envisaged based on response received in 2024.
Arra Communications	N/A	No response to date	N/A	No response to date	None
Broadcasting Authority of Ireland (BAI)	N/A	No response to date	N/A	No response to date	None

Telecoms/Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
BT Communications Ireland LTD	Via Self-service www.ctw4.nl	BT Ireland telecom service. There is no BT Ireland network at this location according to their records.	N/A	No response to date	No potential impacts envisaged, based on response received in 2018.
Commission for Communications Regulation	N/A	No response to date	N/A	No response to date	None
Commission for Regulation of Utilities	N/A	No response to date	N/A	No response to date	None
Development Applications Unit	N/A	No response to date	10th June 2024	Response from the DAU did not make any reference to telecommunications and aviation.	None
Digiweb	N/A	No response to date	N/A	No response to date	None
Eastern and Midland Regional Assembly	N/A	No response to date	N/A	No response to date	None
Echo IT Limited	N/A	No response to date	N/A	No response to date	None

Telecoms/Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
EIR	2nd August 2018	Consultation response identifies that a transmission link within the proposed area may be at risk with regards to the turbine layout. Response recommends a 100m buffer is maintained from the transmission path and turbine location with further information requested on turbine locations. Also notes that all windfarm analysis is to be submitted to Eir (previously Meteor). During the consultation process, mitigation measures were discussed and prior to commencement of construction, 'Eir' will carry out a detailed review of their infrastructure. The applicant will then consult further with 'Eir' to agree mitigation measures if required that would ensure no impact to T10.	N/A	No response to date	Eir will carry out a detailed review of the Proposed Development prior to construction and any mitigation measures necessary will be implemented at that point. T10 location in 2018 (now T9 location) was of particular note. The 2018 project included mitigation measures which were agreed with EIR. The current project now seeks to adopt the same mitigation measures.
EirGrid	N/A	No response to date	N/A	No response to date	None
Electricity Supply Board (Networks)	N/A	No response to date	N/A	No response to date	None

Telecoms/Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
Electricity Supply Board (Telecoms)	17th August 2018	ESB Telecom services have two links in the proximities of the site and recommend a minimum buffer distance of 300m to be maintained. On further consultation, the applicant proposed a number of mitigation measures, including an underground fibre cable to connect the two link ends. 'ESB Telecom' accepted to consider fibre cable and suggested carrying out a detailed analysis prior to construction using the JRC method for diffraction to determine a more precise clearance zone.	N/A	No response to date	ESB Telecoms to carry out a detailed analysis prior to construction, using the JRC method for diffraction; as agreed in 2018.
Imagine LTE	23rd July 2018	Response stipulates that no impact will occur on the Imagine Communications network.	N/A	No response to date	No potential impacts envisaged, based on response received in 2018.
Imagine Networks Services Ltd	23rd July 2018	Response stipulates that no impact will occur on the Imagine Communications network.	N/A	No response to date	No potential impacts envisaged, based on response received in 2018.
Irish Telecom	N/A	No response to date	N/A	N/A	Now Viatel. No response from Viatel in 2024.

Telecoms/Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
Kildare Co.Co.	8th August 2018	General guidance has been provided by the Planning Authority in response to the consultation request. In particular, the consultation response indicates that: if a number of construction compounds are required, these shall be specified in the proposal and their locations identified within the planning application; the planning status of the proposed upgrade to existing access tracks should be confirmed and details of finishes, materials and dimensions should be included; amendments to existing roads required to gain access to the site should be detailed; hard standings areas should be included in the development description and appropriate details provided; location of proposed borrow pits (if any) should be included as well as an indication of the quarries to be used.	N/A	Kildare County Council responded to say that the information provided was being passed to their planning department. No further response received since.	As per the 2018 response, Information required by Kildare Co Co is provided throughout the EIAR. Information specific to material assets provided within this chapter.
Magnet Networks Ltd	N/A	No response to date	N/A	No response to date	None

Telecoms/Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
Minister for Environment, Climate and Communications	N/A		7th June 2024	The Department responded with a submission from the GSI. No comments on telecommunications and aviation.	None
Munster Broadband	N/A	No response to date	N/A	No response to date	None
Netshare Ireland	16th July 2018	Concern expressed that based on provided turbine co-ordinates, the consultation response noted that there would be an impact on Vodafone services. More details are provided in Section 16.4.1	N/A	No response to date	Netshare Impact Study produced and potential mitigation measures have been outlined as a result
Office of Public Works	N/A	-	N/A	No response to date	None
Premier Broadband	N/A	No response to date	N/A	No response to date	None
Ripplecom	16th August 2018	No potential impact caused by proposed windfarm build on their link infrastructure. Further information provided.	N/A	N/A	Ripplecom was acquired by Viatel. No response from Viatel in 2024.

Telecoms/Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
RTE Transmission Network Ltd	16th July 2018	Consultation response envisages a low to moderate risk of interference to TV reception to any households nearby. Requests that the developer enters into a "Windfarm Protocol Agreement" to ensure that reception could be reinstated if any households were affected. Advised to undertake a TV reception survey prior to construction.	13th May 2024	Response from RTE clarified that 2RN are the appropriate body to contact for pre-application consultations regarding wind farms potentially interacting with their infrastructure.	Agreement signed between Applicant and 2RN.
Tetra Ireland Ltd	16th July 2018	Response noted that the proposed development presents no network / coverage concerns to Tetra Ireland.	N/A	No response to date	No potential impacts envisaged, based on response received in 2018.
Three Ireland (Hutchinson) Limited	14th August 2018	Links to be decommissioned in 18 months at time of writing (2018).	N/A	No response to date	Links which may have been potentially impacted are now understood to be decommissioned. No potential impacts envisaged.
Towercom	8th August 2018	Identified a potential issue for some links on Towercom's tower at Cappagh, Cappagh Hill, however, it was found that the azimuth of their antennas are outside the wind farm boundary and so there is no conflict.	N/A	No response to date	No potential impacts envisaged, based on response received in 2018.

Telecoms/Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
Viatel	N/A	Not contacted in 2018	N/A	No response to date	None
Virgin Media Ireland Ltd (PP)	25th July 2018	Response received from Virgin Media. Noted that a microwave link is located approx. 3 km from the wind farm boundary and would not be affected. Any changes to the boundary or turbines added to be forwarded to Virgin Media for assessment.	N/A	No response to date	No potential impacts envisaged, based on response received in 2018.
Vodafone	N/A	-	N/A	No response to date	None
Wireless Connect LTD	N/A	No response to date	N/A	No response to date	None

16.3.2.1 Detailed Scoping Responses

All correspondence received from telecoms operators (TOs) is included in Appendix 16.2 of this EIAR, and is summarised below:

Three Ireland (Hutchinson) Limited

In August 2018, 'Three' advised that the 'Three' links which traversed the proposed site will have been dismantled in 18 months' time. As this time has now elapsed, and no further responses have been provided by Three, no impact is expected to this provider.

Towercom

In August 2018, 'Towercom' provided information on the orientation of their antennas and the azimuth lies outside the wind farm boundary, therefore no impact is expected to this provider.

Netshare

In July 2018, consultation with 'Netshare' indicated 'Vodafone' has one link traversing the proposed site boundary of the wind farm. 'Netshare' carried out an internal impact study of the Proposed Wind Farm on Existing Vodafone Transmission Network. This report has been appended in Appendix 16.3. It concluded that the turbine identified as T10 at the time of writing (now T9) would pose a slight threat to services on the Vodafone Network. However, Netshare were satisfied for the Proposed Development to proceed as long as the following assurances are met:

1. All listed co-ordinates are accurate.
2. Construction and erection of these turbines using cranes, etc, is done in a manner that does not interfere with the Line of site of this microwave during the construction phase.

Eir

Consultation with Eir from August 2018 indicates that an 'Eir' link traverses the proposed site boundary in close proximity to the proposed turbine T10 at the time of writing (now T9). This proposed turbine is currently located at less than the 100m buffer distance from an 'Eir' link, therefore potential impact to Eir services is expected. If any potential impact is expected by Eir, the applicant is committed to implement the required mitigation measures in consultation with Eir. The mitigation measures are outlined in Section 1.3.4 below.

Electricity Supply Board

In August 2018, 'ESB Telecom' advised that there are two links traversing the site. Based on the coordinates provided, 'ESB Telecom' indicated that turbine T12 at the time of writing (now T11) could impact one of their links and an exclusion distance of 299 m was recommended. On further consultation, the applicant proposed a number of mitigation measures, including an underground fibre cable to connect the two link ends. 'ESB Telecom' accepted to consider fibre cable and suggested to carry out a detailed analysis using the JRC method for diffraction to determine a more precise clearance zone.

16.3.3 Assessment of Likely Significant Effects

16.3.3.1 Do- Nothing Scenario

If the Proposed Wind Farm were not to proceed, there would be no change to the existing telecommunications, broadcasting and aviation operations in the area.

Likewise, if the Proposed Substation were not to proceed, there would be no change to telecommunication. Broadcasting and aviation in the area and no impacts on material assets.

16.3.3.2 Telecommunications Impact Assessment

In many cases, impacts can be sufficiently mitigated by ensuring sufficient separation distance between the turbine and any telecommunications link or mast. On that basis, the developer aspired to achieve a design layout that met the agreed separation distances from known telecommunication links and masts, but in certain cases this was not viable due to other site constraints.

Interference to a communication system can occur in the following:

- Signal scattering as a result of the obstruction presented by the blades, an effect that mimics the presence of a lower power source operating from the location of the wind turbine.?
- Signal obstruction as it passes through the area swept by the rotating blade or the tower
- Electromagnetic fields associated with the wind turbine generator

Reflection and Signal Scattering

Wind turbines can act as sources of re-radiation producing delayed 'ghost' signals that are modulated in amplitude by the rotation of the blades. Radio waves can be reflected by many surfaces including turbines, reflection can interfere with the quality of the signal.

Signal Obstruction

If an absorbing object such as a wind turbine is placed in the path of a radio wave obstruction can occur, detrimentally affecting the signal detected at the receiver. This is an impact that needs to be avoided in the case of point-to-point links, unless appropriate mitigation measures are provided to negate the impact.

Electromagnetic Fields

The operation of a wind turbine generator, and associated electrical transmission infrastructure, creates an electromagnetic field which can theoretically interfere with telecommunication signals. However, electromagnetic field levels in the vicinity of wind turbines are relatively low and diminish rapidly with distance.

All TO's potentially impacted by the proposed development were contacted in order to establish what potential impacts, if any, there could be to their service. 5 TO's confirmed that a number of turbines could potentially impact their services: 'Three', 'Towercom', 'Netshare(Vodafone)', 'Eir' and 'ESB Telecoms'.

Consultation with them resulted in the following conclusions:

- Three: The links from Three were to be dismantled before the Proposed Development is constructed, so there will be no impact to this provider.

- Towercom: Information of the antennas provided by Towercom indicated that their azimuth lies outside the wind farm boundary, therefore no impact is expected.
- Netshare: 'Netshare' seeks assurances that co-ordinates are accurate for all turbines and in particular T10 at the time of the consultation (now T9), which is the closest turbine to this microwave link. If the above-mentioned assurances are met, there would be no issue with the Proposed Development.
- Eir: An Eir link traverses the proposed site at 66m distance from the proposed T10 (now T9). A meeting with the telecom provider will be arranged to discuss detailed design mitigation measures if required at time of construction. The mitigation measures are outlined in Section 1.3.4.
- ESB Telecom: 'ESB Telecoms' has indicated that turbine T12 (now T11) will impact one of their links and will require an exclusion distance of 299 m. The applicant has agreed that ESB Telecom carry out a detailed analysis using the JRC method for diffraction to determine a more precise clearance zone. When this analysis is carried out and if there are still concerns, the mitigation measures as outlined in Section 1.3.4 will be imposed at the developer's expense.

There are no other wind turbines (operational, consented or currently in planning) located within the vicinity that could add cumulative impacts to this assessment. The nearest wind farms to the proposed wind farm are Cushaling Wind Farm c. 11.8km south west and Cloncreen Wind Farm, c. 13 km south west. As such, there is no prospect for cumulative effects to occur.

Television and Radio Reception

Consultation with RTE indicates that there will be no impact to any of their microwave telecoms links but there is low to moderate risk of interference to TV reception to any households to the west and north west of the Proposed Development. Mitigation of this potential interference could require some remedial measures in relation to television reception. In practice, such measures are not difficult to implement, are relatively inexpensive and if necessary will be undertaken by the developer in conjunction with 2rn/RTÉ.

A 2rn Protocol Agreement has been signed by North Kildare WF Ltd and 2rn in relation to interference on viewers television sets and broadcast radio receivers. This protocol has been included in Appendix 16.4. RTE also recommended in their email to undertake a TV reception survey before construction.

16.3.3.3 Decommissioning Phase

There are no electromagnetic interference impacts associated with the decommissioning phases of the Proposed Wind Farm and Proposed Substation, and therefore no mitigation is required. There is potential for brief disconnection of overhead lines during the decommissioning phase if large turbine components are required to be removed from the wind farm site. This has potential to cause a brief slight negative impact to telecommunication services where overhead lines require disconnection.

The Proposed Substation, including the underground cable will remain in situ and will become an ESB networks asset and will be part of the national electricity grid and therefore it is not proposed to remove this cable.

There are no decommissioning related impacts on telecommunications and broadcasting interests in the area.

16.3.4 Mitigation Measures

Sections 5.10 of the Department of Environment Heritage and Local Government (DoEHLG) Planning Guidelines on Wind Energy Developments (2006) acknowledge that "electromagnetic interference can be overcome". The preliminary telecommunication impact assessment identified during the consultation the operators with the highest likelihood for impact. It was agreed with these operators that there are a number of mitigation options that can be explored to overcome any residual impacts. The following link mitigation measures will be implemented as necessary to overcome electromagnetic interference:

- Technology Upgrade: Replacement of the existing telecommunications service equipment with another less affected type;
- Diverting telecommunications links - The possibility of diverting telecommunication links to another telecommunications tower in the vicinity can be investigated;
- Special Purpose Mitigation Tower - the possibility of diverting the existing links and consolidating the existing towers to one tower can be explored;
- Relocation of telecommunications equipment - The possibility of moving telecommunication equipment to another telecommunications tower in the vicinity can be investigated;
- Fiber-optic communication systems – The possibility of installing fibre cables underground in conjunction with Wind Farm electricity transmission cables could be explored. The use of underground fibre optic cable in lieu of telecommunication links would avoid the wind farm interference effects;
- Wind Turbine Tower – To mitigate interference the turbine tower could be utilised as a transmitter/receiver (hop point);
- Combination – The possibility of providing a mix of the above could be explored.

Mitigation options may be different for each service affected, depending on the type of service and the level of any interference expected.

Based on the consultation carried out with 'Netshare' and in order to mitigate any impact to Vodafone Transmission Network, the following assurances should be complied with:

1. All listed co-ordinates are accurate.
2. Construction and erection of these turbines using cranes, etc, is done in a manner that does not interfere with the Line of site of this microwave during the construction phase.

In order to mitigate potential impacts to 'Eir' infrastructure, prior to commencement of construction, 'Eir' will carry out a detailed review of their infrastructure and the applicant will consult with 'Eir' to agree measures that ensure no impact to T9 (T10 when this was discussed with Eir previously). ESB Telecom have agreed to carry out a detailed analysis using the JRC method for diffraction to determine a more precise clearance zone that will confirm if the current clearance is sufficient to ensure no impact to T11 (T12 when this was discussed with Eir previously). If the detailed analysis which will be carried out prior to construction based on best available updated information on the link concludes that the current distance does not meet the required exclusion zone, the applicant will agree one of the 7 no. mitigation measures outlined above. The mitigation measures will be imposed at the developer's expense.

The Developer has given an undertaking to cover the cost of implementing the necessary mitigation measures to prevent any degradation of service that is currently provided. This approach is consistent with the guidelines and satisfactory to the relevant operators that may be affected.

16.3.5 Cumulative Impacts

The full list of projects is contained in Appendix 1.2 of this EIAR. Given that there will be no impact from the Proposed Development, there will be no cumulative impacts relating to the Proposed Development and surrounding projects in relation to telecommunications.

16.3.6 Residual Effects

The implementation of a suitable mitigation strategy will ensure that local telecommunications are not adversely affected by the Proposed Development. As outlined above, where providers expressed concerns, additional information was provided to them and where necessary mitigations were agreed with these providers to ensure there would not be an impact on their services. The telecommunications mitigation strategy shall be carefully implemented to ensure there are no unintended consequential effects, such as:

- Introducing any new impacts to existing telecommunications services.
- The cumulative effects of additional turbines, or additional wind farms.
- Cumulative effects of any mitigation methods.
- Any interaction with regard to other existing or proposed wind farms, or telecommunications facilities, in the area.

16.4 Aviation

16.4.1 Methodology

This section of the assessment describes the methodology used in assessing the potential effects from the Proposed Development on aviation.

As part of the EIAR scoping and consultation exercise, relevant aviation authorities were consulted. Scoping was carried out in accordance with EPA Guidelines[1] and the 'Best Practice Guidelines for the Irish Wind Energy Industry 2012[2] which provides a recommended list of aviation stakeholders for consultation. An updated list of stakeholders was developed through consultation with the Commission for Communications Regulation and the Irish Aviation Authority.

The following assessment methodology was applied in this assessment:

- Consultation with the Irish Aviation Authority;
- Identification of aerodromes and airports in proximity to the project, and any associated infrastructure;

[1] EPA, (2022) 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'
[2] IWEA. (2012). Best Practice Guidelines for the Irish Wind Energy Industry.

- Engagement of a specialist Aviation consultant Straten Consulting Services Limited (Straten CSL) to carry out an Aviation Impact Assessment.

16.4.1.1 Background and Potential Effects

Both wind energy and aviation are important to Irish national interests and these industries have legitimate interests that must be balanced carefully. The presence of tall obstacles must be assessed in the aviation context to understand their impact. This process assists aviation stakeholders, wind energy developers and planning authorities when reviewing the viability of wind turbine developments.

Safeguarding of aviation interests considers the evaluation of obstacles as:

Physical obstructions: refers to obstacles that impact the Obstacle Limitation Surfaces (OLS) of an airport and the Instrument Flight Procedures (IFPs) providing aircraft with a route network between airports. Obstacles also need to be considered in the broader airspace environment and associated minimum flying altitudes.

Technical Impact: This refers to the Communication, Navigation and Surveillance (CNS) systems supporting aviation. As these systems rely on radio frequencies, it is important to understand the impact to the frequencies either through disruption or shielding, which can result in communication blockages, faulty navigation or creation of clutter on Air Traffic Control radar displays.

FT consulted with the Irish Aviation Authority (IAA), Dublin Airport Authority (DAA) and the Department of Defence (DoD) to establish if the Proposed Development could potentially impact on aviation. A Scoping Report was sent as part of this consultation in 2018, and a follow-up scoping update letter was issued in 2024.

16.4.1.2 Relevant Guidance

To address concerns from aviation stakeholders, a detailed assessment is required of the areas identified through published aviation policy and guidance. The aviation industry has a well-documented safety management process, as a result this study has undertaken a review of publicly available publications from the Irish Aviation Authority (IAA), Department of Defence, International Civil Aviation organisation (ICAO), Eurocontrol, and the European Aviation Safety Agency (EASA). Reference documentation is identified below:

- IAA Aerodrome Licensing Manual
- Sets out the aerodrome manual requirement, specifically:
- Section 4.13 Obstacle Control
- Section 4.17 Protection of Sites for Radar and Navigational Aids
- Section 4.18 Management of Air Traffic in the Airspace Associated with the Aerodrome
- IAA Policy on Land Use and Planning and Offshore Development.
- Describes the role of the IAA, airspace users, aerodrome operators, providers of aviation communications, navigation and surveillance (CNS) systems and providers of other air navigation services (e.g. air traffic control and flight information services) and planning authorities.
- IAA, Obstacles to Aircraft in Flight order.
- Provides the definition of an obstacle, specifically for obstacles 45m and higher; reporting and information in respect of obstacles and the marking and lighting of obstacles.
- European Aviation Safety Agency (EASA), Standardised European Rules of the Air (SERA).

- Defines the applicable 'Rules of the Air' and sets out the minimum heights above obstacles, under a variety of weather and visibility conditions.
- ICAO EUR Doc 015, European Guidance Material on Managing Building Restricted Areas.
- Defines the protection area to be considered around aviation infrastructure systems (CNS).
- Eurocontrol Guidance for Assessment of the Potential Impact of Wind Turbines on Surveillance Sensors.
- Specific guidance on criteria for surveillance systems (radar).
- Irish Department of Defence, Irish Air Corp, Defence Publications
- A review of publicly available publications to consider planning information related to aviation activities and aeronautical publications.
- Irish Integrated Aeronautical Information Publication (IAIP).
- The consolidation of aviation information and airspace for Ireland, managed by Airnav Ireland, in conformance to international requirements.
- UK Civil Aviation Authority (CAA) Civil Air Publication (CAP) 764, Policy and Guidelines on Wind Turbines.
- Although not specific to Ireland, the UK guidance material is valid supporting information, specific to wind turbines within the aviation regulatory environment.

The recommended consultation zone within the vicinity of an aerodrome varies according to the type of service available and associated airspace procedures. The guidance recommends the following distances:

- Obstacle Limitation Surfaces: Up to 15km from a licensed aerodrome's reference point (ARP). Unlicensed aerodromes have no defined criteria but 5km has been considered as an acceptable area to consider.
- Published Instrument Flight procedures: Radius of 56 km from an airport.
- Surveillance: There are two types of Radar, Primary Surveillance Radar (PSR and Secondary Surveillance Radar (SSR).
- PSR requires assessment within line of sight;
- SSR requires assessment within 16 km.
- Navigational Aids: Within 10 km of the facility.
- VHF Communications: Within 10 km of the facility.

In addition, other relevant guidance and policy was considered including;

- Guidelines on Wind Energy Development 2006
- Kildare County Council Development Plan 2023 - 2029

16.4.2 Scoping and Consultation

In accordance with the WEG 2006 as part of the EIAR scoping and consultation exercise, FT contacted the Irish Aviation Authority, Airport Authorities and other relevant consultees including the Department of Defence.

A Scoping Report was sent as part of this consultation in 2018, for an earlier design iteration of the Proposed Development. An updated letter was sent to consultees in 2024 to inform them of the latest iteration of the Proposed Development, which included the 11-turbine Proposed Wind Farm and the 110 kV Proposed Substation as presented in Figure 3-3 of Chapter 3.

The Aviation stakeholders were provided with the locations and dimensions of the proposed turbines and asked to advise whether any impact could occur to their networks.

As part of the scoping and consultation process, the Kildare County Development Plan was consulted, with the following policy objectives identified in Table 16-2.

Table 16-2 Policy Objectives of the Kildare County Development Plan 2023.

Policy Reference	Policy Objective	Response.
TM O131	Safeguard aerodromes and air navigation in Kildare by application of international 'obstacle limitation standards' – in particular the ICAO Standards and Recommended Practices contained in "Annex 14" to the Convention on International Civil Aviation (for those aerodromes subject to ICAO Standards), and the EASA Aerodrome Certification Specifications (for any aerodrome subject to EASA Specifications), and to take into account (per ICAO guidance) any 'shielding' that may be provided by existing 'obstacles' in the vicinity.	Section 1.1 Methodology, of the Straten CSL report refers to IAA Aerodrome Licensing Manual, Section 4.13 Obstacle Control. This manual is the State, through the Irish Aviation Act, response to ICAO Annex 14 and EASA Aerodrome Specifications.
TM O132	Analyse the impact of any new aerodromes, or of an intensification of use of existing aerodromes, on the established character and amenities of an area, with a general presumption against development where the technical and safety requirements associated with such development would be contrary to the proper planning and sustainable development of the County.	No new aerodromes or intensification of use of existing aerodromes identified. The aviation assessment, in its entirety, addresses the technical and safety requirements associated with the development.
TM O133	Consult with the Irish Aviation Authority in regard to applications in the vicinity of aerodromes, and in regard to developments that may exceed 45 metres in height above ground level, or 45m above the aerodrome's datum level, or where it is considered appropriate.	IAA were consulted. See Table 16-3 below. IAA advised to contact Dublin Airport Authority and AirNav Ireland to inform them of the proposed development and to request any comments or observations. It is important to note that the Certifications Standards and Guidance Material, i.e., regulations issued by the IAA are applied in this assessment

Policy Reference	Policy Objective	Response.
TM O134	Refer, where appropriate, proposed wind farm development applications located within MOA4 (as per Map 5.2) and refer proposed solar farm development applications located within 3km of the Curragh Camp to the Department of Defence.	See Table 16-3 below. The DoD were consulted. The DoD noted that the Proposed Development is located within MOA3, MOA4 and within 20 NM of Baldonnel and therefore will be assessing the application once it is submitted
TM O140	Require an aviation analysis to be provided for any proposed development within the areas coloured dark grey on the CDP "Map of Areas of Aviation Significance", and to require aviation analysis for development of over 15m in height (above ground level) within the areas coloured light grey on the same map, and for development of over 30m in height above ground level in all other areas (and this analysis should take into account the elevations-OD/AMSL (a) of the proposed development, and (b) of the ground levels on the site, and (c) of any relevant aviation 'obstacle limitation surfaces'. Please see Map Ref. 5.2.	As required an Aviation Impact Assessment (AIA) has been carried out by an experienced aviation consultant, Mr. John van Hoogstraten Managing Director of Straten Consulting Services Limited (Straten CSL). Please refer to Section 1.4.2 for AIA assessment.
TM O152	Refer any development of greater than 45m height above ground level within 37km of Casement Aerodrome to the Department of Defence.	See Table 16-3 below. The DoD were consulted. The DoD noted that the Proposed Development is located within MOA3, MOA4 and within 20 NM of Baldonnel and therefore will be assessing the application once it is submitted
TM O156	Refer to the IAA, the IAA-ANSP (Air Navigation Services Provider) and to Dublin Airport Authority any proposed development of more than 90m above ground level which might lie under the small part of Dublin Airport's Obstacle Limitation Surface which lies above Kildare.	Proposed development does not fall in any part of the Dublin Airport OLS therefore not applicable.

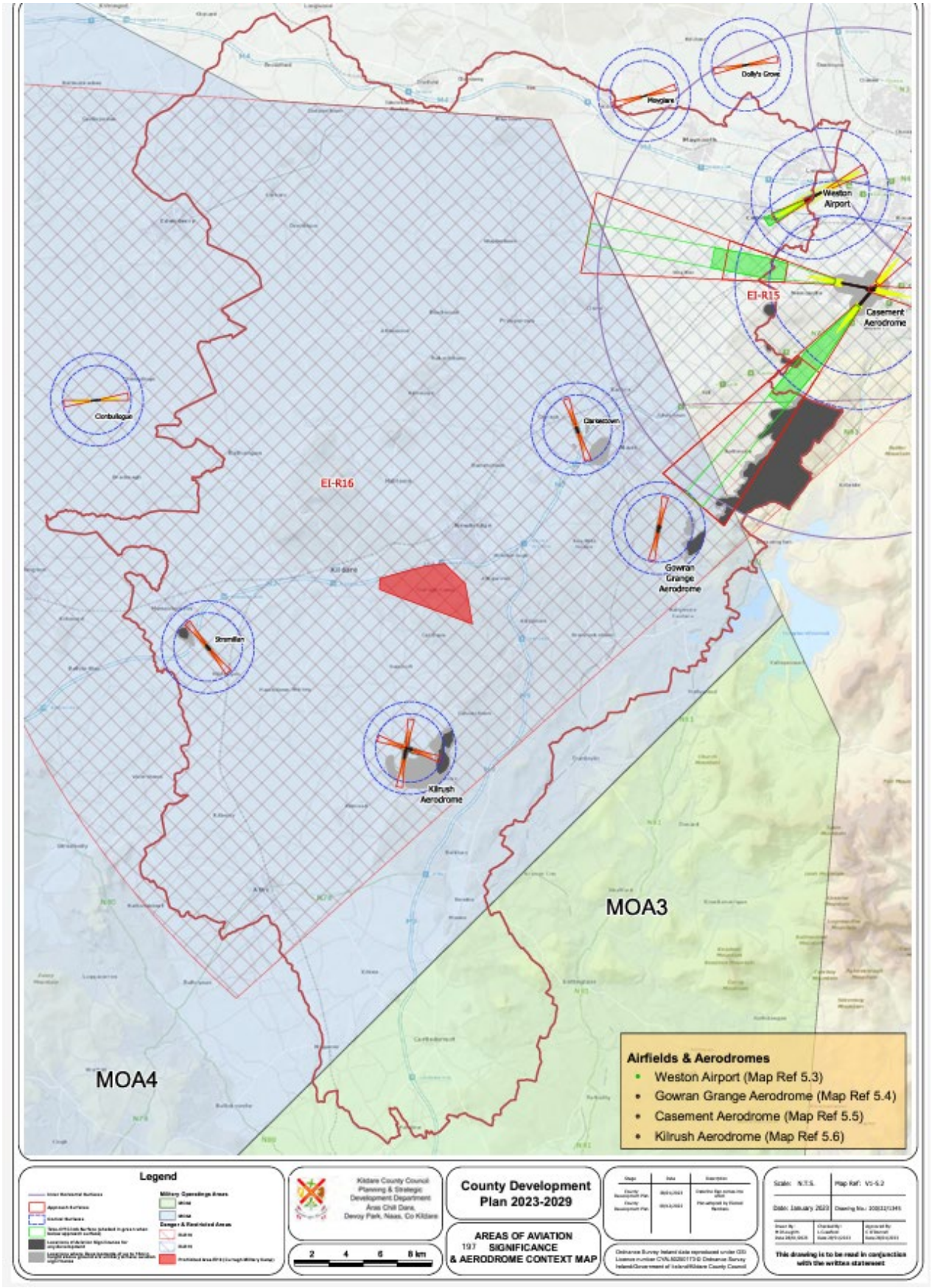

Figure 16-1: Map 5. 2 of Chapter 5 of the Kildare County Development Plan 2023.

The responses received from aviation consultees are summarised in Table 16-3 following:

Table 16-3: Aviation Consultees Responses

Aviation Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
Baldonnel/ Casement Aerodrome	N/A	No response to date	N/A	No response to date	None
Department of Defence	1st August 2018	Provided initial observations including detail regarding potential affects to certain townlands and roads, request for evaluation report and EIAR when available, request for impacts on aviation report when completed. Also included in the consultation response is the Air Corps Windfarm and Tall Structure Position Paper.	28th May 2024	The representative from the Department requested that all turbines should be fitted with Type C, Medium intensity, Fixed Red obstacle lighting and be operational 24/7. They also noted that the Proposed Development is located within MOA3, MOA4 and within 20 NM of Baldonnel and therefore will be assessing the application once it is submitted	The Applicant commissioned an Aviation Consultant to examine the request from the Department of Defence and to prepare an Aviation Impact Assessment.
Dublin Airport Authority	N/A	No response to date	N/A	No response to date	None
Irish Aviation Authority	30th July 2018	Advised to contact Weston Aerodrome and Casement Aerodrome to inform them of the proposed development and to request any comments or observations	29th May 2024	Advised to contact Dublin Airport Authority and AirNav Ireland to inform them of the proposed development and to request any comments or observations. IAA also advised of some likely next steps, should the Proposed Development receive planning permission.	Contacted DAA and AirNav as per the advice of IAA. No response received from DAA or AirNav.

Aviation Operator	Response date 2018	Response details	Response date 2024	Response details	Notes
Weston Airfield	N/A	No response to date	N/A	No response to date	None

16.4.2.1 Detailed Scoping Responses.

All consultation received from aviation operators is included in Appendix 16.5 and further impacts are outlined in the section below.

Irish Aviation Authority

The Irish Aviation Authority (IAA) were consulted and responded in 2018 stating in their letter that they advised the Applicant to contact Weston and Casement Aerodromes as well as requesting further information about the development to conduct a full assessment. Additionally, and in the event of planning consent being granted, necessary mitigation measures should be carried out and are outlined in Section 1.4.4.

The IAA were contacted again in 2024 with the scoping update letter, showing the revised layout of the turbines (the layout of the Proposed Wind Farm) and the Proposed Substation. On this occasion, the IAA advised the Applicant to contact Dublin Airport Authority and AirNav Ireland.

Casement and Weston Aerodromes

FT has made contact with the aerodromes (Casement and Weston) to inform them of the Proposed Development and request any comments. No response has been received from Weston Aerodrome to date.

Dublin Airport Authority

FT has made contact with Dublin Airport Authority to inform them of the Proposed Development and request any comments. No response has been received from Dublin Airport Authority to date.

AirNav Ireland

FT has made contact with AirNav Ireland to inform them of the Proposed Development and request any comments. No response has been received from Dublin Airport Authority to date.

Department of Defence

The Department of Defence were consulted in 2018 and responded, attaching their Air Corp Draft Document called 'Air Corp Wind Farm/Tall Structures Position Paper' (dated August 2014). This draft position paper requests that 'applications or proposals for structures in these areas of a height greater than 45m above ground level at the site of the object must be referred to Irish Air Corps for assessment of potential impact on flight operations.

In 2024, the Department of Defence requested that all turbines are illuminated by Type C, Medium intensity, Fixed Red obstacle lighting, visible to Night Vision equipment. This lighting requirement is in line with the request from IAA in 2018. They also advised that the site is located within proximity to Irish Air Corps Restricted Area EI-R16 and the area contained within MOA3, MOA4 and within 20 NM of Baldonnel.

In terms of the observations raised by the DOD's, the issues can be summarised as follows;

First Observation:

1. Obstacles above 45m need to be published and obstacles 150m and above require aviation lighting. The DOD have submitted an additional requirement for Infra-Red lighting to accommodate night vision equipment. This is understood and accepted as a requirement.

Second Observation:

1. The proposed development falls within the lateral boundary for MOA4. As demonstrated within this report, there is unlikely to be an impact to operations as a result of the proposed development.

2. MOA3 is approximately 30km to the northwest of the proposed development, i.e., the proposed development is well clear of the lateral limits of MOA3 and therefore will not impact operations within that designated area.
3. In terms of proximity to EI-R16, the airspace designation commences at an altitude above the proposed development and therefore vertically clear of the designated area.
4. In summary, the proposed development should not be a concern to the DOD on the basis that it:
    a) Falls within the lateral limits of MOA4, with penetration up to 4500ft at own discretion, i.e., no restrictions;
    b) Does not fall within the lateral limits of MOA3 therefore no impact; and
    c) Is vertically clear of EI-R16.

16.4.3 Assessment of Likely Significant Effects

16.4.3.1 Do- Nothing Scenario

If the Proposed Development were not to proceed, there would be no change to the existing aviation operations in the area.

16.4.3.2 Aviation Impact Assessment

A detailed aviation assessment is captured within this section using the guidance against the aviation standards and recommended practices, applied both international and nationally. The purpose of this assessment is to determine what impact, if any, the proposed development may have on aviation. This is an evidence-based approach on all publicly available publications.

The Proposed Development site is located approximately 40km west of Dublin Airport, approximately 27km from Baldonnel/Casement Aerodrome, 25km from Weston Airport and Clonbulloge Airfield is located at approximately 19km. Clonbulloge Airfield is currently owned by the Irish Parachute Club, which is based at the airfield, flying restrictions are enforced around this area, and parachuting activities are particularly popular at the weekends and public holidays. A number of unlicensed airfields are located approximately 10km which include Allenwood Airstrip, Milicent Airfield, Moyglare Airfield and Taggarts Airstrip. illustrates the airfields in the vicinity of the site.

The recommended consultation zone within the vicinity of an aerodrome varies according to the type of service available and associated airspace procedures. The guidance recommends the following distances:

- Obstacle Limitation Surfaces: Up to 15km from a licensed aerodrome's reference point (ARP). Unlicensed aerodromes have no defined criteria but a 5km radius from the airfield is considered an acceptable area to consider.
- Published Instrument Flight procedures: Radius of 56km from an airport.
- Surveillance: There are two types of Radar, Primary Surveillance Radar (PSR and Secondary Surveillance Radar (SSR).
    - PSR requires assessment within line of sight;
    - SSR requires assessment within 16km
    - Navigational Aids: Within 10km of the facility;
- VHF Communications: Within 10km of the facility.

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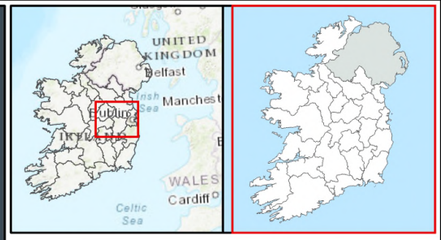

Legend

- Proposed Development Boundary
- 20km
- 40km
- Airfields

Kilometers
0 2.5 5 10

TITLE:	Airfields Within the Vicinity of the Proposed Development		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	16.2		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:350,000	**REVISION:**	0
DATE:	01/05/2025	**PAGE SIZE:**	A3

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16.4.3.2.1 Obstacle Limitation Surfaces (OLS)

The initial review identified that nearby aerodromes with licensed aerodromes, Dublin, Baldonnel/Casement, Weston and Clonbulloge are all beyond the 15km consideration to the OLS.

Although some unlicensed airfields are approximately within 10km of the proposed development, the review identified none within 5km.

Therefore, the proposed development will not impact the OLS of any nearby aerodromes.

16.4.3.2.2 Instrument Flight Procedures (IFP)

Only Dublin, Weston and Baldonnel/Casement aerodromes have published IFPs, these all fall within the 56km of the Proposed Development.

The proposed development falls within a classification of airspace known as Class G. Class G airspace is known as 'Uncontrolled Airspace' meaning aircraft are not subject to air traffic control by any authority, military or civilian. IFP design requires that the procedures be contained within Controlled Airspace, therefore there is unlikely to be an impact to the IFPs serving Baldonnel/Casement, Weston and Dublin Airports.

Dublin Airport has a published ATC Surveillance Minimum Altitude Chart that supports 'vectoring[3]' of aircraft. The minimum altitude available for vectoring, in the area of the proposed development, is 4000ft Above Mean Sea Level (AMSL), Figure 16-3 indicates the location of the proposed development. The Minimum Obstacle Clearance Altitude (MOCA) required between the lowest altitude and the highest obstacle is 1000ft. The highest terrain in the area of the proposed development is not above 300ft AMSL, using this as a worst-case elevation with the addition of the wind turbine maximum tip height of 167m (converted is 555ft) results in the obstacle being 855ft AMSL. Therefore, there is sufficient buffer between the lowest available altitude and the created obstacle environment.

[3] Vectoring is the action of ATC providing headings to an aircraft to fly. As a result, it remains the responsibility of ATC to ensure the area being vectored in is free of terrain and obstacles.

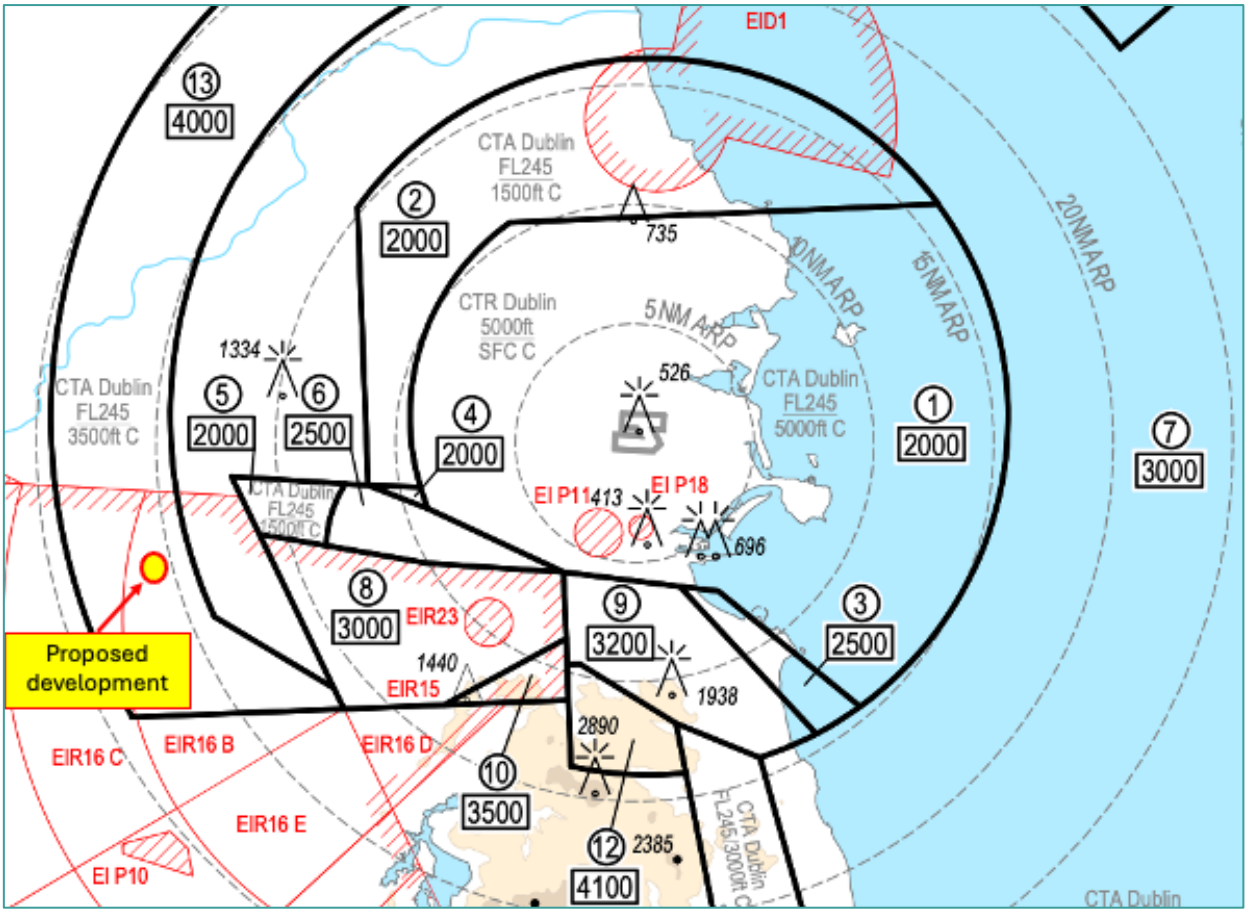

Figure 16-3: Dublin ATC Surveillance Minimum Altitude Chart EIDW AD 2.24-43.1 dated 01 Dec 2022

16.4.3.2.3 Airspace

The airspace surrounding the proposed development extends from surface level and is capped above by military restricted airspace notified as EIR16(B), this airspace is published as 1000ft AMSL to FL240 (FL = Flight Level and is circa 24000ft AMSL). Class G airspace is subject to a set of mandatory rules and any aircraft is able to operate within this area and an air traffic control service is not available, but flight information service is available on request. Pilots operating under Visual Flight Rules (VFR) in Class G airspace are ultimately responsible for seeing and avoiding other aircraft and obstacles as contained within SERA.5005, Visual Flight Rules.

Restricted airspace EIR16(B) is also contained within civilian Controlled Airspace managed by Airnav Ireland from the Dublin Airport Air Traffic Control Centre. As depicted in Figure 16-3 the airspace is Class C airspace and extends from 3500ft AMSL to FL245. The overlap of military and civilian airspace is not uncommon and is shared on the basis of Flexible Use of Airspace (FUA). The application of FUA is an internationally accepted practice for military to have use of a portion of airspace when not required for civilian use and vice-versa.

Activities within Restricted airspace is required to be contained within the volume of airspace assigned, this includes high-energy movements and associated recovery procedures in the event of an over-shoot. The proposed development falls within Class G, clear of EIR16(B), and therefore will not impact Air Corps operations.

However, the proposed development does fall within a larger area for Air Corps operations published[4] as Military Operating Area 4 (MOA4). MOA4 has a published vertical limit from surface (ground level) to FL450 (circa. 45000ft). The publicly published information for the airspace permits penetration of other flights up to 4500ft without permission required. Therefore, airspace users have relative freedom of airspace access of up to 4500ft meaning the proposed development should not impact safe operations in this airspace on the basis the obstacle environment will be published and lit according to aviation requirements. A known obstacle environment cannot be deemed more unsafe than other aircraft entering the same volume airspace without permission.

16.4.3.2.4 Surveillance Radar

Two types of radar surveillance are used within Ireland, namely Primary Surveillance radar (PSR and Secondary Surveillance Radar (SSR).

PSR is a non-cooperative system that detects any moving target which is then processed to the Air Traffic Control (ATC) display screen. A wind turbine can, in some cases, cause the PSR to detect the moving blades of a windfarm. There are three PSR systems in Ireland located at Dublin, Shannon and Cork airports. Figure 1-4 provides an overview of the radar coverage from these radar sites at 167m, i.e., at a height that the turbines may be visible.

It is evident that the proposed development falls within the Dublin coverage at 169m and as a result there may be an impact. Figure 1-5 is a zoomed in depiction of the Dublin PSR in relation to the turbine locations. Whilst the entire development site is within PSR coverage, it is highly unlikely that this will cause an impact to ATC operations at Dublin Airport. This is based on the type of operations and use of radar processing, coupled with the use of SSR that will result in an unlikely impact.

[4] Irish AIP ENR 5.2

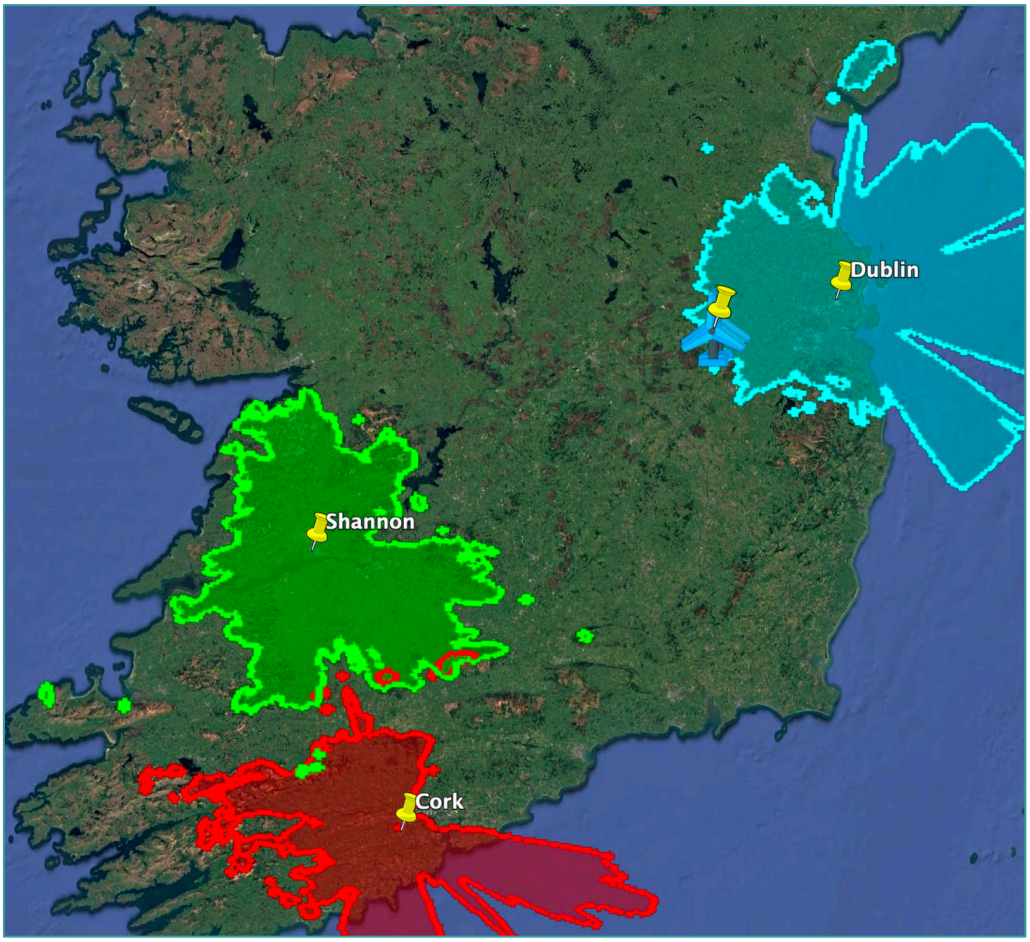

Figure 16-4: PSR locations and coverage at 167m above ground level

Mitigation for the potential impact to the Dublin PSR is managed through radar processing where multiple radar feeds are processed through a centralised system and fed through to the ATC display as a single view of airborne aircraft. This radar processing system will filter spurious data and discard in the final display to ATC.

Figure 16-5: Dublin PSR coverage zoomed in over proposed development

SSR is a cooperative system that interacts with aircraft-based systems known as transponders. Eurocontrol guidance[5], adopted by the European Aviation Safety Agency (EASA), states that obstacles beyond 16km from an SSR site will not impact the system and that no assessment is required. Since all SSR radar sites are beyond 16km from the proposed development there is no impact to these systems.

16.4.3.2.5 Navigational Aids and Communication Systems

The navigational aid and communication infrastructure supporting the ATC and aviation environment is located within the relevant airport boundaries. The criteria to determine whether these infrastructure systems will be impacted is for them to be located within 10km of the proposed development. Local unlicensed airfields do not have any supporting infrastructure and therefore not impacted.

Given the airport distances are beyond 10km, there is no impact and therefore no requirement for further assessment.

[5] Eurocontrol Guidelines for Assessment the Potential Impact of Wind Turbines on Surveillance Sensors, Version 1.2, dated 09 September 2014

16.4.3.3 Decommissioning

During the decommissioning phase, the turbines will be dismantled and removed from the site, thereby removing all potential obstacles to future aviation interests. Thus, there will be no likely effects on aviation during the decommissioning phase.

Furthermore, the Proposed Substation will be left in situ. As the Proposed Substation does not comprise any components exceeding 45 m height there are no operational or left in situ related impacts on aviation interests as a result of the operation of the Proposed Substation.

16.4.4 Mitigation Measures

Following consultation with the IAA in 2018 and further consultation with the DoD in 2024 lighting requirements for turbines should be conditioned as follows:

1. Single turbines or turbines delineating corners of a wind farm should be illuminated by high intensity obstacle strobe lights.
2. Obstruction lighting elsewhere in a wind farm will be of a pattern that will allow the hazard to be identified and avoided by aircraft in flight.
3. Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment. Obstruction lighting fitted to obstacles must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum specifically at or near 850 nanometres (NM) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light. Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment.
4. Provide as-constructed co-ordinates in WGS84 format together with ground and tip height elevations at each wind turbine location.
5. Notify the Authority of intention to commence crane operations with a minimum of 30 days prior notification of their erection.

As with any tall structure development, the potential impact to aviation is that of an obstacle. Aviation ‘Rules of the Air’ provide guidance to pilots on how to remain clear of obstacles and the distances required to remain clear.

The Proposed Development, whilst present within MOA4, does not present as an impact to Air Corps operations given the freedom of aircraft to access the airspace below 4500ft without permission. Access without notification presents a higher degree of risk to Air Corps operations than that of the proposed development, which is a fixed location which is notified (formally published) and lit.

The mitigation is addressed through promulgation of the obstacle environment through the Irish Integrated Aeronautical Information Publication. In addition, the obstacles will be lit to conform to aviation standards and the additional night vision requirement from the DOD. It must be noted that night vision requirements are a common requirement and therefore the solution is readily available.

16.4.5 Cumulative Impacts

The full list of projects is contained in Appendix 1.2 of this EIAR. Given that there will be no impact from the proposed development, there will be no cumulative impacts relating to the Proposed Development and surrounding projects in relation to aviation.

16.4.6 Residual Impacts

No residual impacts are expected.

As outlined above, a professional aviation consultant has undertaken an aviation assessment and determined that there will be no significant impact from the proposed turbines on air traffic in the vicinity of the site given the relevant small-scale nature of the project in the context of the overall available airspace and with the implementation of mitigation measures, therefore no residual impacts are likely to occur.

16.5 References

'Wind Energy Development Planning Guidelines', Department of the Environment, Heritage and Local Government, 2006.

'Best Practice Guidelines for the Irish Wind Energy Industry', Irish Wind Energy Association, 2012.

Kildare County Development Plan 2023-2029

IAA Aerodrome Licensing Manual, Issue 4, dated 09 December 2015.

IAA Policy on Land Use and Planning and Offshore Development, Version 1.00, dated 25 March 2015.

IAA, Obstacles to Aircraft in Flight order, S.I. No. 14/2002, dated 01 March 2002.

European Aviation Safety Agency (EASA), Standardised European Rules of the Air (SERA), dated February 2023.

ICAO EUR Doc 015, European Guidance Material on Managing Building Restricted Areas, 3rd edition, dated November 2015.

Eurocontrol Guidelines for Assessment the Potential Impact of Wind Turbines on Surveillance Sensors, Version 1.2, dated 09 September 2014.

Irish Department of Defence, Irish Air Corp, Defence Publications, accessed 13 October 2024.

Irish Integrated Aeronautical Information Publication (AIP), AIRAC Cycle 009/24, effective date 03 October 2024.

UK Civil Aviation Authority (CAA) Civil Air Publication (CAP) 764, Policy and Guidelines on Wind Turbines, 6th Edition, dated February 2016.

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