MWP

Appendix 14C – Aviation Report

Ballynisky Wind Farm

Ballynisky Green Energy Ltd.

December 2025

Report

Ballynisky Wind Farm

Aviation Review Statement

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Executive Summary

Malachy Walsh and Partners commissioned Ai Bridges Ltd to review the possible impacts of the proposed wind farm at Ballynisky on aviation systems in the vicinity of the proposed development. As part of the review, the following subjects were considered:

- Annex 14 - Obstacle Limitation Surfaces (OLS)
- Annex 15 – Aerodrome Surfaces
- Minimum Sector Altitudes (MSA)
- Instrument Flight Procedures
- Permitted and Operational Wind Farms in vicinity of Proposed Wind Farm
- Communications, Navigation and Radar Surveillance Systems Safeguarding
- Flight Inspection and Calibration
- Aeronautical Obstacle Warning Light Scheme

A review shows that the proposed turbines at Ballynisky would be located outside the OLS surface for Shannon Airport. However, should the proposed wind farm be permitted, the turbines would be within 45km of the Airport's ARP and would be greater than 100m in height. Therefore the turbines would be required to be included in the IAA Electronic Air Navigation Obstacle Dataset.

Regarding the Minimum Sector Altitudes, there would be over 1000 ft from the maximum height of the wind farm to the applicable MSA and there would be no impact on the published MSA altitudes for Shannon Airport. A detailed instrument flight procedure analysis is outside of the scope of this report; however, from the desktop assessment conducted it is envisaged that the flight procedures for Shannon Airport are unlikely to be impacted.

As the proposed turbines are approximately 20 km from the Localizer and transmitting antenna at Shannon Airport, it is very unlikely that they would have any impact on these ATS communications and radio navigational aids. For Radar Surveillance Systems, it has been highlighted that all of the proposed turbines would be located 19 km – 20 km from the PSR/SSR radar station at Shannon and in Assessment Zone 4 of the EUROCONTROL Guidelines. As the turbines are located in Assessment Zone 4, a detailed impact assessment on Radar Surveillance Systems should not be required by the IAA.

It is also highly unlikely that the Flight Inspection Procedures for Shannon Airport will be impacted by the proposed turbines as the procedures should already account for the existing wind farms at Carrons and Grouselodge. In addition, analysis of flight data (from previous annual flight checks) shows that during a test flight, there would be a clearance distance of at least 3600 ft between the proposed turbines and the test aircraft. At this distance, it is highly unlikely that there would be any impact on the flight inspection procedures

In the consultation response received from the IAA (Appendix A), it was recommended that the developer should engage directly with Shannon Airport (including IAA-ANSP and Engineering) to make them aware of the proposed wind farm and to ensure appropriate screening from an aviation safety perspective. It has also been requested that in the event that planning consent is granted, the applicant should be conditioned to contact the IAA to: (1) agree

an aeronautical obstacle warning light scheme for the wind farm development, (2) provide as-constructed coordinates in WGS84 format together with ground and blade tip height elevations at each wind turbine location and (3) notify the authority of intention to commence crane operations with a least 30 days prior notification of their erection.

Shannon Airport Group was subsequently notified of the proposed wind farm development and provided with a summary of the findings of this Aviation Review Statement. In the consultation response received from Shannon Airport Group, they stated that they would review Aviation Review Statement summary and revert with any comments. The consultation response received from Shannon Airport Group is provided in Appendix B.

Sections

Appendices

1. Introduction

This section provides a brief summary of the proposed wind farm at Ballynisky and of the nearest significant aviation installation at Shannon Airport which is 20 km to the northeast of the proposed development.

1.1 Site Information

The proposed wind farm development is located approximately 6 km west of Rathkeale, Co Limerick. The wind farm is proposed to consist of six wind turbines. The preliminary wind turbine co-ordinates and turbine heights are shown below in Table 1. Figure 1 shows the proposed wind turbine layout with respect to Shannon Airport.

Turbine	Co-ordinates (ITM)		Max Turbine Tip Height (AGL) (m)	Turbine Base (AMSL) (m)	Max Tip Height (AMSL)	
	Easting	Northing			Meters (m)	Feet (ft)
BY_T01	529899	643084	158	48	206	675.9
BY_T02	529841	642685	158	49	207	679.2
BY_T03	529655	642322	158	55	213	698.9
BY_T04	530064	642172	158	50	213	682.4
BY_T05	530232	642542	158	47	205	672.6
BT_T06	530454	642876	158	46	204	669.3

Table 1. Proposed Wind Turbine Details

Figure 1. Location of proposed wind farm

1.2 Shannon Airport

Table 2 below shows the co-ordinates of Shannon Airport and the distance from the Airport Reference Point (ARP) to the wind farm. Shannon Airport operates in Class C controlled airspace with Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) Flight rules.

Location	Installation	Description	Airport Ref. Point ARP	ARP Distance to Proposed wind Farm (km)
Shannon, Co Clare	International Airport	Single Asphalt Runway Airspace: Class C	52 42 07 N 008 55 29 W (Mid-point of Runway 06/24).	20 km

Table 2. Shannon Airport Details

The aeronautical navigation aids at the aerodrome include DVOR/DME, NDB, ILS LOC and ILS GP.

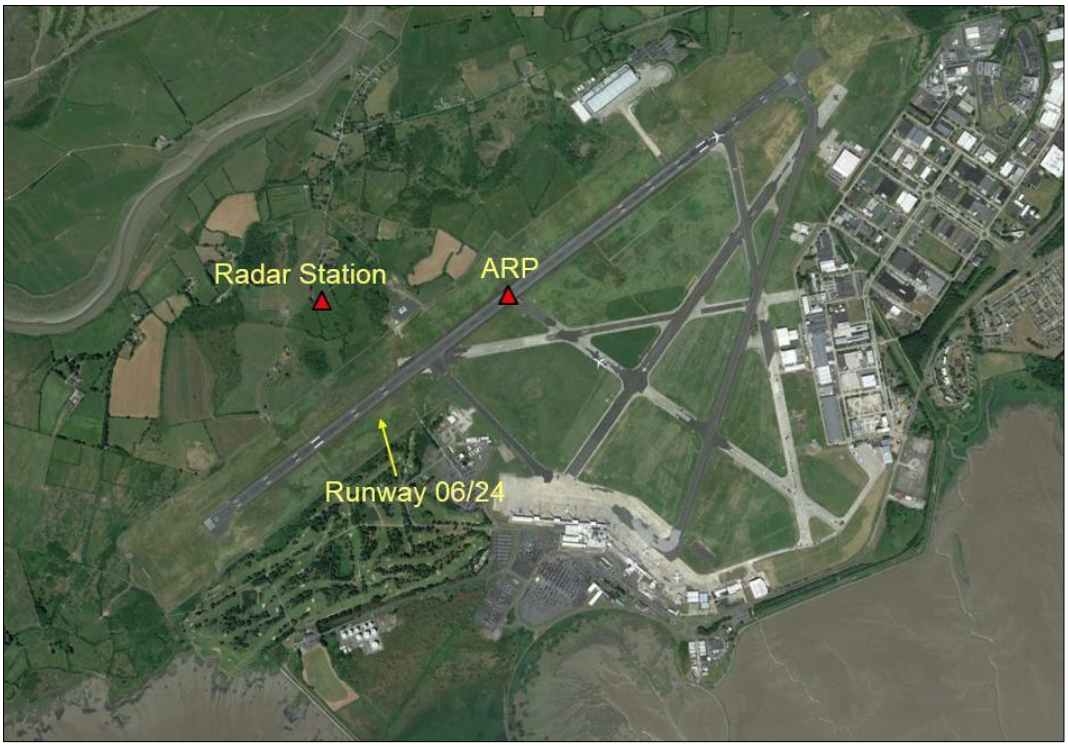

Figure 2. Shannon International Airport

2. Competency of Assessor

Ai Bridges is a leading supplier of telecommunications solutions and software services for the telecommunications industry in the Irish marketplace. We provide comprehensive turnkey solutions and have extensive experience and knowledge of network design, implementation and deployment of telecommunications software modelling and design solutions. We have designed and commissioned telecommunications projects for clients throughout Ireland and abroad and have worked successfully with leading vendors to bring telecommunications software solutions to market for the renewable energy sector.

Ai Bridges has been supplying telecommunications solutions to wind farm industry throughout the Republic of Ireland, Northern Ireland and the UK since 2007. Aviation Screening & Review Statements, Telecommunications Impact Assessments and Electromagnetic Interference Impact Studies, which have been undertaken on behalf of wind farm operators on the potential impact on telecommunications networks and transmission networks of proposed wind farm developments. Ai Bridges has also developed a 3D software prediction model that can predict the wind farm development interference impacts on television transmission and aviation networks.

This report for the proposed development was prepared by Ai Bridges who have experience in telecommunications signals analysis for EIA purposes. Ai Bridges Ltd has extensive experience in the wind farm industry and have previously worked with many utility companies under Framework Agreements for Telecommunications Signal Interference Surveying and Remediation Services.

3. Aviation Review

In this section a review of the following Aviation topics is provided.

- Annex 14 - Obstacle Limitation Surfaces (OLS)
- Annex 15 – Aerodrome Surfaces
- Minimum Sector Altitudes (MSA)
- Instrument Flight Procedures
- Permitted and Operational Wind Farms in vicinity of proposed Wind Farm
- Communications, Navigation and Radar Surveillance Systems Safeguarding
- Flight Inspection and Calibration
- Aeronautical Obstacle Warning Light Scheme

3.1 Annex 14 Obstacle Limitation Surfaces (OLS)

A review of the Annex 14 Obstacles Limitation Surfaces (OLS) was carried out by first plotting the proposed turbines and the airport obstacle surfaces. The obstacle limitation surfaces for Shannon Airport are plotted based on the following:

- Annex 14 to the Convention on International Civil Aviation Aerodromes Volume I - Aerodrome Design and Operations Seventh Edition July 2016”
- Certification Specifications and Guidance Material for Aerodromes Design CS-ADR-DSN Issue 4, 8th of December 2017

Figure 3 below shows the Shannon Airport OLS in relation to the proposed Ballynisky Wind Farm. The distance from the Airport ARP, located at the runway centre-point, to the nearest of the proposed wind turbines is 20 km. The analysis of the OLS plots indicates that the proposed turbines do not penetrate the Outer Horizontal Surface which extends to 15 km from the Airport Reference Point (ARP).

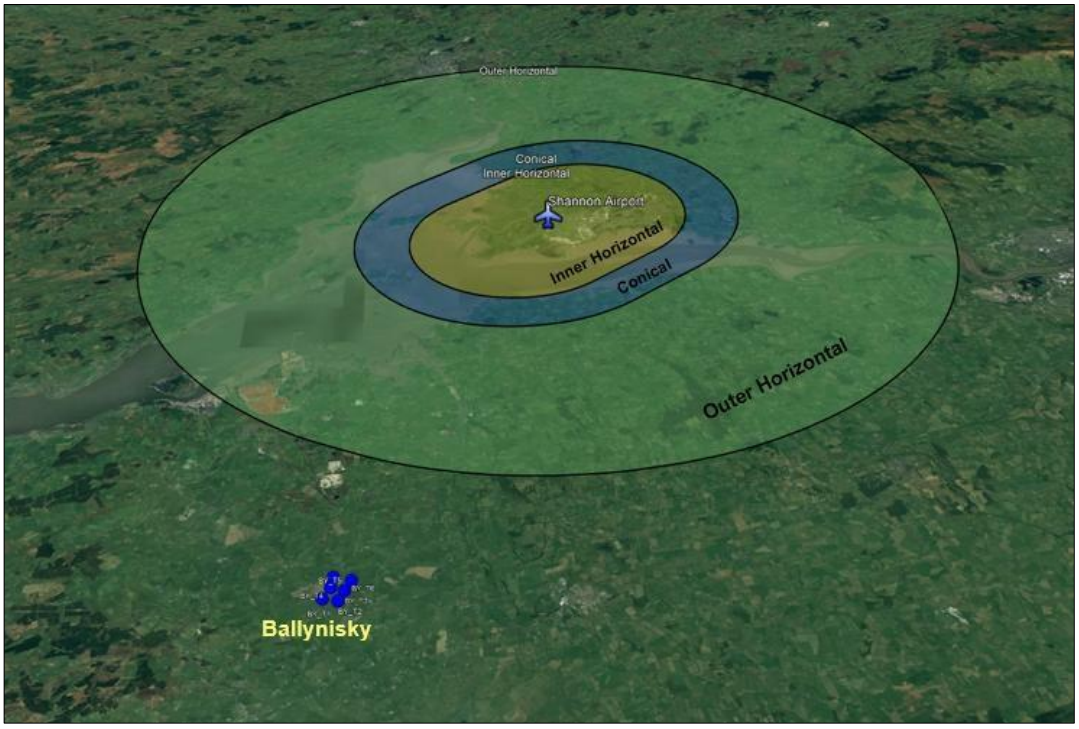

Figure 3. Proposed Wind Farm in relation to Shannon Airport OLS.

3.2 Annex 15 Aerodrome Surfaces

The proposed wind turbines would penetrate the ICAO Annex 15 Aerodrome Surface as shown in Figure 4. The "*Terrain and obstacle requirements Area 1*" is defined in ICAO Annex 15 as an area of 45km from the Aerodrome ARP. (An illustration of ICAO Annex 15 Area 1 Surface is provided in Appendix C).

As the proposed wind turbines are at an approximate distance of 20 km from Shannon ARP there is penetration of the Annex 15 surface. All obstacles, if they are more than 100 meters above terrain for a distance of 45km from Shannon ARP, need to be registered in the IAA Air Navigation Obstacle Data Set. This 45km area is known as the TMA area i.e. Total Maneuvering Area and is used for en-route circling and maneuvering and is shown in Figure 4.

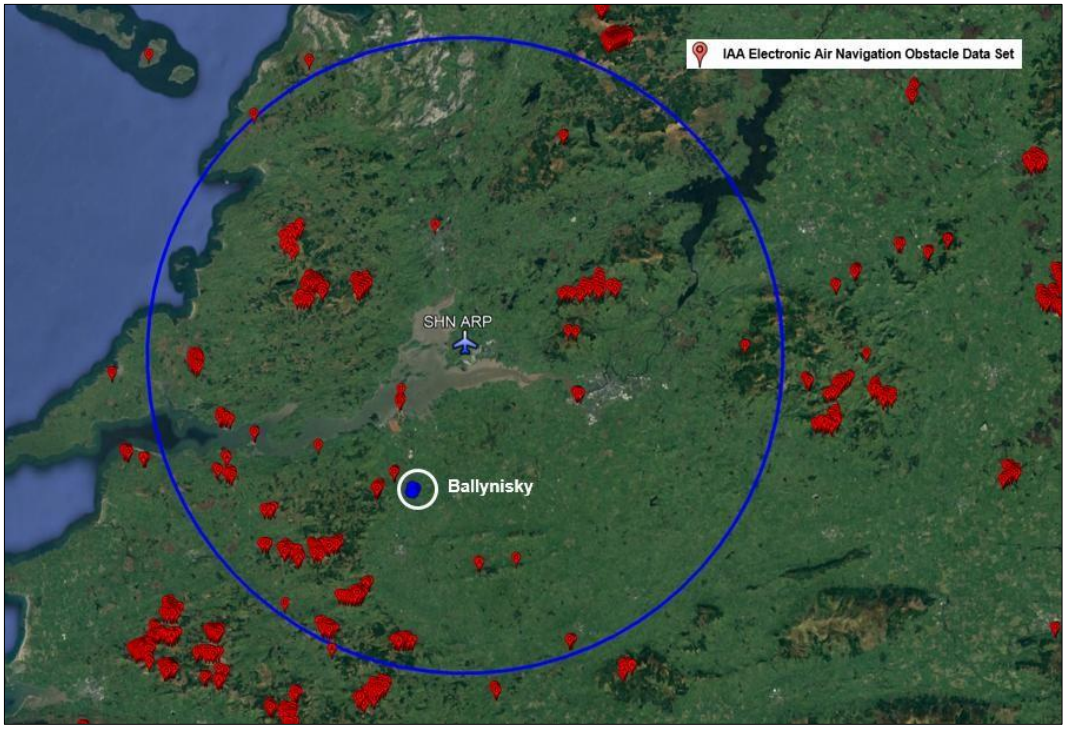

Figure 4. Annex 15 Aerodrome Surface and IAA Electronic Air Navigation Obstacle Data Set

It should be noted that there are other existing tall structures in the vicinity of the proposed wind farm and are listed in Table 3 below. The permitted obstacles are shown in Figure 5 below and include the existing Carrons and Grouselodge wind farms. It should also be noted that the chimneys at the Aughinish Alumina facility (permitted obstacles) are located less than 12 km from Shannon Airport.

Obstacle ID	Obstacle Type	Obstacle Height (AMSL) (ft)
Aughinish Alumina	Industrial Structure (Chimney)	417
Carrons Wind Farm	Wind Turbine	640
Grouselodge Wind Farm	Wind Turbine	1011

Table 3. Permitted Obstacles in vicinity of Ballynisky Wind Farm

Figure 5. Permitted Obstacles in vicinity of Ballynisky Wind Farm

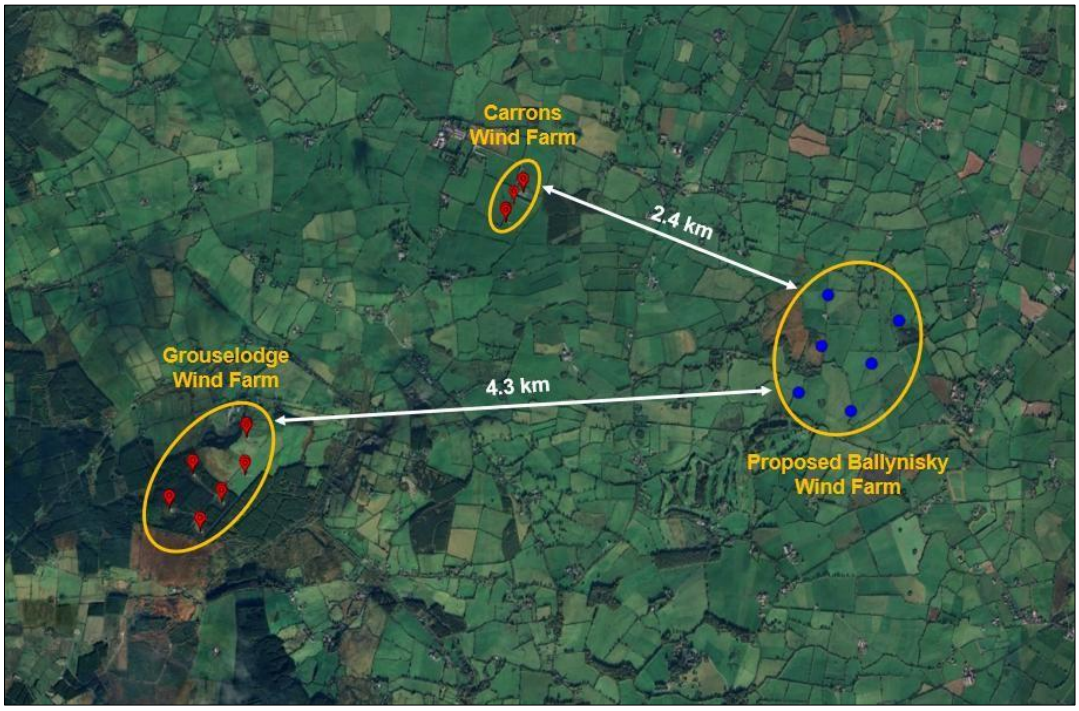

Figure 6. Ballynisky shown relative to Carrons and Grouselodge Wind Farms

Although there are other obstacles relatively near the proposed wind farm, all obstacles must be considered and assessed to see if they cause a “hazard to air navigation” and all Terrain Obstacle Data (including man-made obstacles) have to be considered by the relevant Aviation Authorities.

3.3 Minimum Sector Altitudes

A review of the Minimum Sector Altitudes (MSA) shows that the proposed wind turbines are within 25 nautical miles from the VOR/DME at Shannon Airport. The MSA provides a minimum obstacle clearance of 1000 ft above the highest obstacle within specified sectors. The wind turbines are located within the Main Sector (MSA 3000 ft), as shown in Figure 7.

According to the wind turbine locations, the maximum construction height for the site would be 2000 ft/609.6m AMSL (3000 ft MVA minus 1000 ft) which is greater than the maximum tip of the proposed turbine elevation of 698.9 ft AMSL. Therefore the MSA of the Main Sector will not be affected and there will be no impact on the published MSA altitude figures.

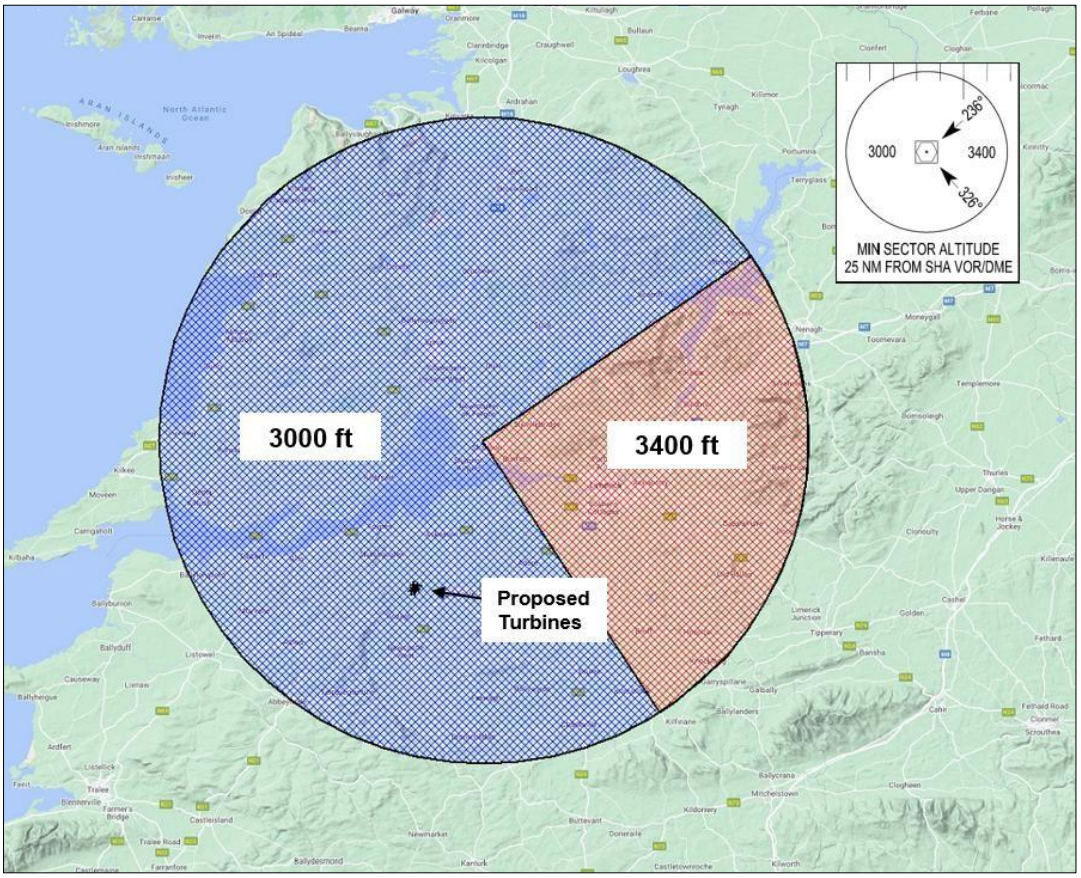

Figure 7. Shannon Airport (EINN) Minimum Sector Altitudes

3.4 Instrument Flight Procedures

There are nine published Instrument and Visual Flight Procedures. Any analysis of the Instrument Flight Procedures at Shannon Airport (EINN) would need to consider if the instrument and visual flight procedures in Table 4 below are affected by the proposed wind turbines.

AIP Chart	RWY	Procedures
EINN AD 2.24-5	06	RNAV Standard Instrument Departure Chart RWY 06
EINN AD 2.24-6	24	RNAV Standard Instrument Departure Chart RWY 24
EINN AD 2.24-7	06	RNAV Standard Arrival Chart RWY 06
EINN AD 2.24-8	24	RNAV Standard Arrival Chart RWY 24
EINN AD 2.24-10	06	Instrument Approach Chart ILS or LOC RWY 06
EINN AD 2.24-11	06	Instrument Approach Chart VOR RWY 06
EINN AD 2.24-13	24	Instrument Approach Chart ILS CAT I & II or LOC 24
EINN AD 2.24-14	24	Instrument Approach Chart VOR RWY 24
EINN AD 2.24-15	-	Visual Approach Chart – ICAO

Table 4. Shannon Airport Instrument and Visual Flight Procedures

The proposed wind farm is shown in Figure 8 below in relation to the Shannon Airport Runway 06 instrument approach (Ref. EINN AD 2.24-10 - Instrument Approach Chart ILS or LOC RWY 06). The proposed wind farm is sufficiently far from the approach flight path into RWY06 (Figure 8) that it is unlikely that there would be any issues.

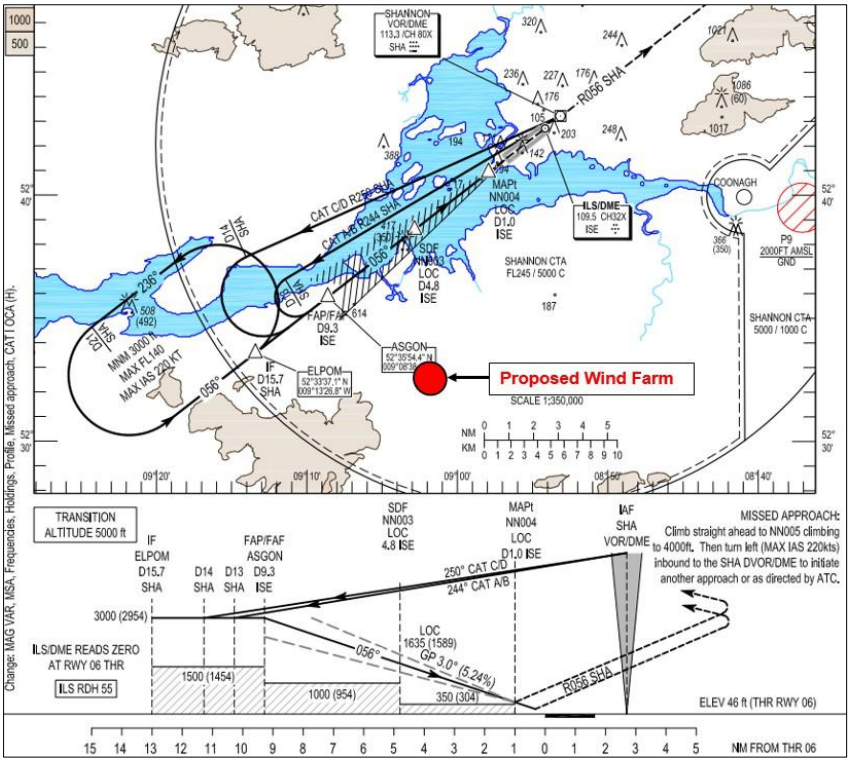

Figure 8. EINN AD 2.24-10 - Instrument Approach Chart ILS or LOC RWY 06

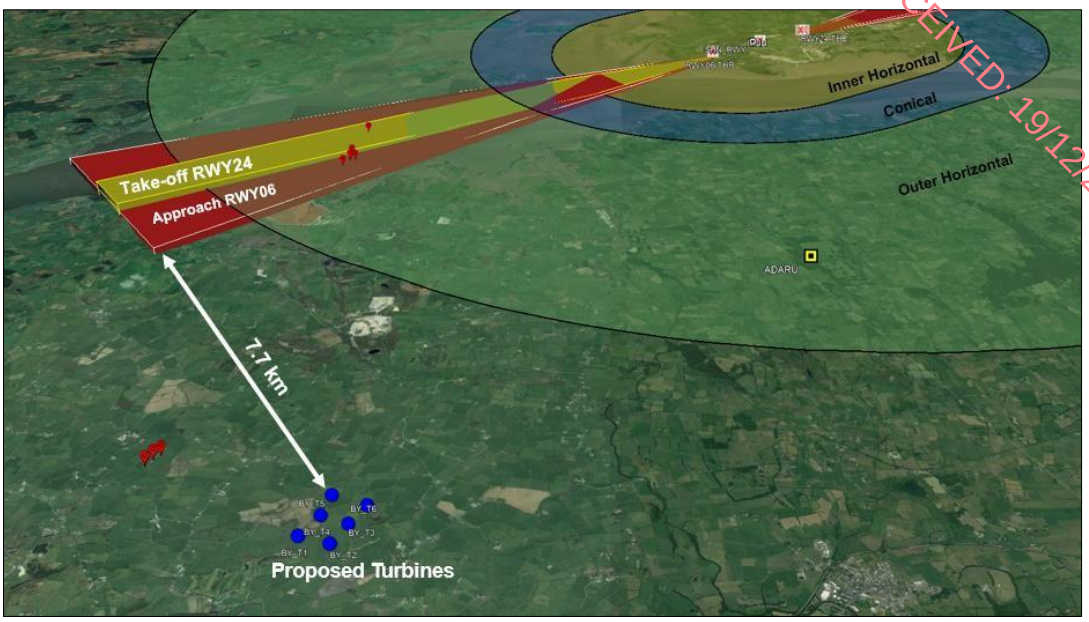

Figure 9. Annex 14 Approach Surface

Figure 10 below shows the standard instrument departure chart for Shannon Airport Runway 24 (Ref. EINN AD 2.24-6.1 – RNAV Standard Instrument Departure RWY 24). The nearest flight departure paths to the proposed windfarm are ADARU-KURUM and BUNON.

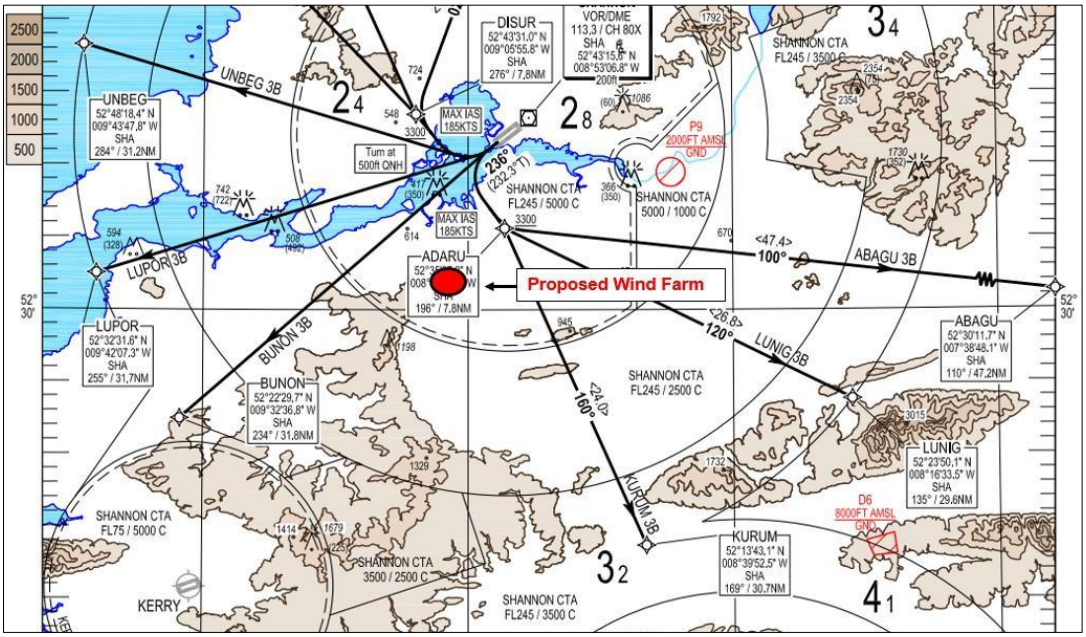

Figure 10. EINN AD 2.24-6.1 – Standard Instrument Departure Chart RWY 24

It can been seen in Figure 11 that the flight departure path to ADARU-KURUM and BUNON is clear of the proposed turbines and would not be impacted.

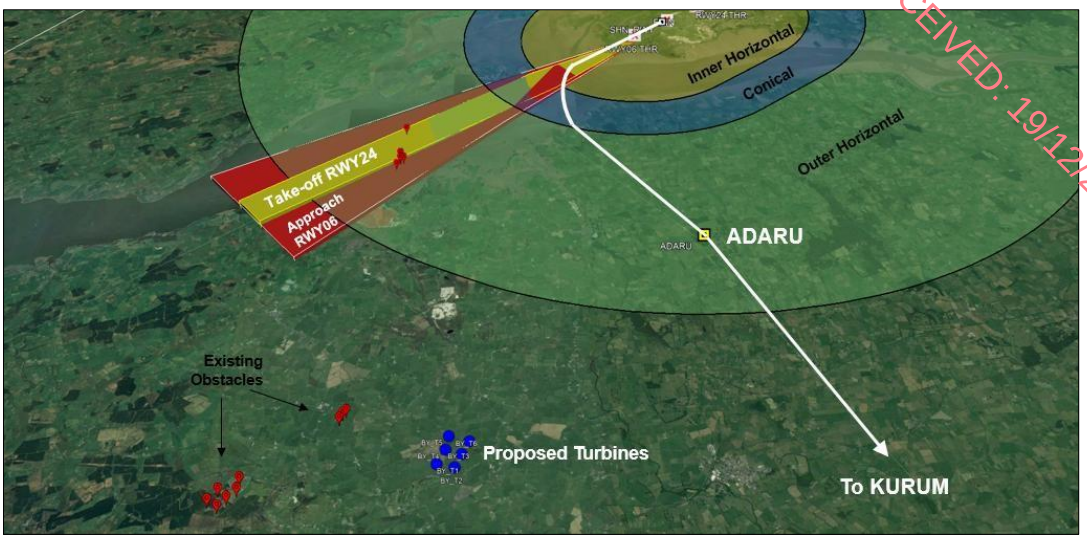

Figure 11. Standard Instrument Departure Flight Path – ADARU-KURUM

It can been seen in Figure 12 that the flight departure path to BUNON is clear of the proposed turbines and would not be impacted.

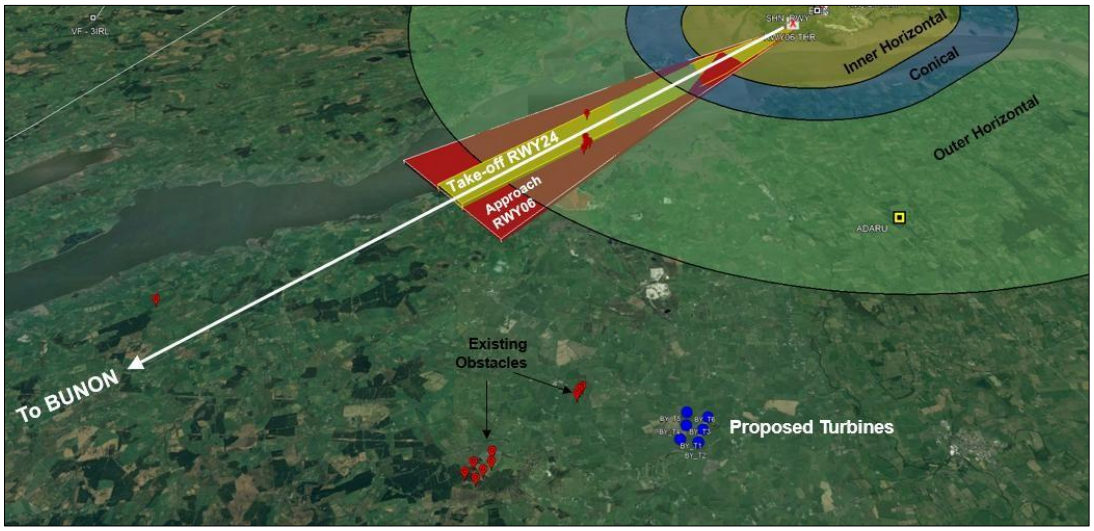

Figure 12. Standard Instrument Departure Flight Path - BUNON

3.5 Permitted and Operational Wind Farms in Vicinity of Proposed Wind Farm

The Planning References for the permitted Wind Farm(s) in the vicinity of the proposed wind farm are shown below in Table 5. Each of these wind farms were permitted and constructed and there was no amendments or re-design of Instrument Flight Procedures required.

Wind Farm	Planning Reference	Description
Carrons Wind Farm	11-165	Operational Wind Farm
Grouselodge Wind Farm	04-3415	Operational Wind Farm

Table 5. Permitted wind farms in vicinity of proposed wind farm.

3.6 Communication Navigation and Surveillance Systems

3.6.1 Communications and Navigation Systems

The AIP EINN AD 2-8 provides the information for communication and navigation facilities. EINN AD 2.18 shows that the ATS communications facilities operates on channel frequencies of 118MHz -130MHZ and EINN AD 2.19 shows that Radio Navigation and Landing Aids operates on channel frequencies of 339KHz – 330MHz. As the proposed turbines are approximately 20 km from the Localizer and transmitting antenna, it is very unlikely that the proposed wind turbines will have any impact on these ATS communications and radio navigational aids. Typically, interference to VHF communications systems will only occur when obstacles are in close proximity to the VHF transmitter. e.g. less than 500m.

3.6.2 Radar Surveillance Systems

The tables below show the Irish Aviation Authority Assessment Zone arrangement for the two types of aviation radar surveillance systems; Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR).

Zone	Description	Assessment Requirements
Zone 1	0 - 500m	Safeguarding
Zone 2	500m - 15km and in radar line of sight	Detailed Assessment
Zone 3	Further than 15km and in radar line of sight	Simple Assessment
Zone 4	Not in radar line of sight	No Assessment

Table 6. PSR Zone Arrangements

Zone	Description	Assessment Requirements
Zone 1	0 - 500m	Safeguarding
Zone 2	500m - 16km but within maximum instrumented range and in radar line of sight	Detailed Assessment
Zone 4	Further than 16km or not in radar line of sight	No Assessment

Table 7. SSR Zone Arrangements

The EUROCONTROL Guidelines require a 16km safe distance for a “Zone 4 - No Assessment” condition and detailed assessments are required for any proposed wind within 16km of a secondary surveillance radar.

It should be noted that in the UK, NATS (Air Traffic Control) safeguards SSR to a distance of 10km. The guidelines used by NATS (*CAP 764: Chapter 2: Impact of wind turbines on aviation*) state that:

> *“Wind turbine effects on SSR are traditionally less than those on PSRs but can be caused due to the physical blanking and diffracting effects of the turbine towers, depending on the size of the turbines and the wind farm. These effects are typically only a consideration when the turbines are located very close to the SSR i.e. less than 10 km.”*

3.6.2.1 Irish Aviation Authority (IAA) Radar Surveillance Sensors

To determine which Assessment Zones are applicable to the proposed wind farm a desktop assessment was carried out. The nearest radar surveillance sites to the proposed wind farm development are at Woodcock Hill and Shannon Airport.

Figure 13. Radar Surveillance Sites relative to proposed wind farm.

3.6.2.1.1 Woodcock Hill SSR Radar Assessment

The radar surveillance site at Woodcock Hill consists of a SSR system housed in the dome-shaped structure shown in Figure 14.

Figure 14. SSR at Woodcock Hill

Table 8 below shows the (EuroControl & NATS) assessment zone applicable to each of the proposed turbines, which have been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

ID	Distance to PSR/SSR	Radar LOS to PSR/SSR	Radar LOS Assessment (EuroControl Guidelines)	Radar LOS Assessment (NATS Guidelines – UK)
T01	30.3 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T02	30.6 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T03	31.0 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T04	30.8 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T05	30.4 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T06	30.0 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required

Table 8. EuroControl / UK Safeguarding Guidelines – Woodcock Hill SSR

3.6.2.1.2 Shannon SSR Radar Assessment

The radar surveillance site at Shannon Airport consists of a PSR and a SSR. The PSR and the SSR antennas are co-located in the same structure at Shannon Airport as shown below in Figure 15.

Figure 15. PSR and SSR at Shannon Airport

Table 9 below shows the (EuroControl & NATS) assessment zone applicable to each of the proposed turbines, which have been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

ID	Distance to PSR/SSR	Radar LOS to PSR/SSR	Radar LOS Assessment (EuroControl Guidelines)	Radar LOS Assessment (NATS Guidelines – UK)
T01	19.6 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T02	20.1 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T03	20.5 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T04	20.5 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T05	20.1 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required
T06	19.7 km	Yes	Zone 4 - Detailed Assessment Not Required	Zone 4 - Detailed Assessment Not Required

Table 9. EuroControl / UK Safeguarding Guidelines – Shannon PSR/SSR

As the table above shows, all of the proposed turbines are located in Assessment Zone 4 as specified by the EUROCONTROL and NATS guidelines, which would indicate that a detailed technical assessment would not be required.

3.7 Flight Inspection and Calibration

Flight checks are conducted annually to ensure that flight procedures and associated navigational aids are safe and accurate. These flight checks are carried out by an IAA approved Flight Inspection Service Provider. The checks are carried out during annual inspections consisting of radial and orbital test flights around Shannon Airport for calibration of instrument landing systems.

Figure 16 below illustrates the radial and orbital test flight paths for Shannon Airport. As the figure shows, there are existing obstacles (i.e. Carrons and Grouselodge wind farms) in the vicinity of the proposed development, and it is unlikely that the Flight Inspection Procedures would be impacted by the addition of the proposed turbines at Ballynisky.

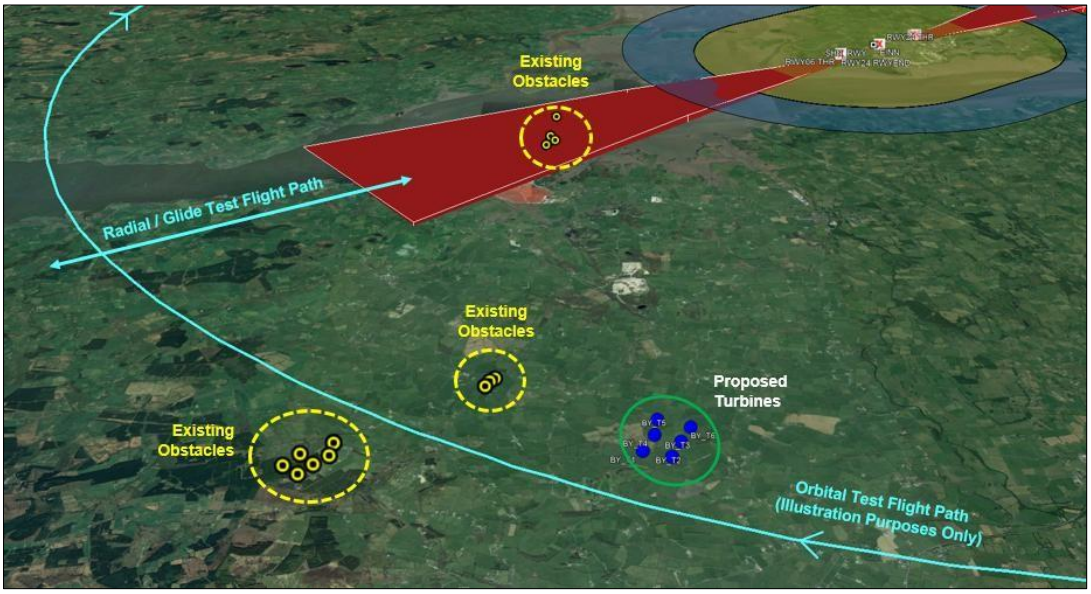

Figure 16. Illustration of Radial and Orbital test flight paths for Shannon Airport

To further assess the impact of the proposed development, flight data (routes and altitudes) from the most recent publicly available flight checks were obtained and plotted relative to the proposed turbines.

The flight data shows that radial flight routes would be more than 10,000 ft (lateral distance) from the proposed development. At this distance there would be no impact on the flight inspection procedures for Radial Test Flights.

The flight data (from 2023, 2024 and 2025) shows that the Orbital Test Flights did fly over the site of the proposed development. Close-up views of the Test Aircraft on its orbital flights around Shannon Airport are shown below in Figures 17, 18 & 19. The flight data shows the minimum altitude of the Test Aircraft, as it flies over the proposed development site is 4325 ft ASL.

As the highest of the proposed turbines at Ballynisky would have a tip-height of 699 ft ASL, there would be a clearance distance of at least 3600 ft to the Test Aircraft. At this distance, it is highly unlikely that there would be any impact on the flight inspection procedures for Orbital Test Flights.

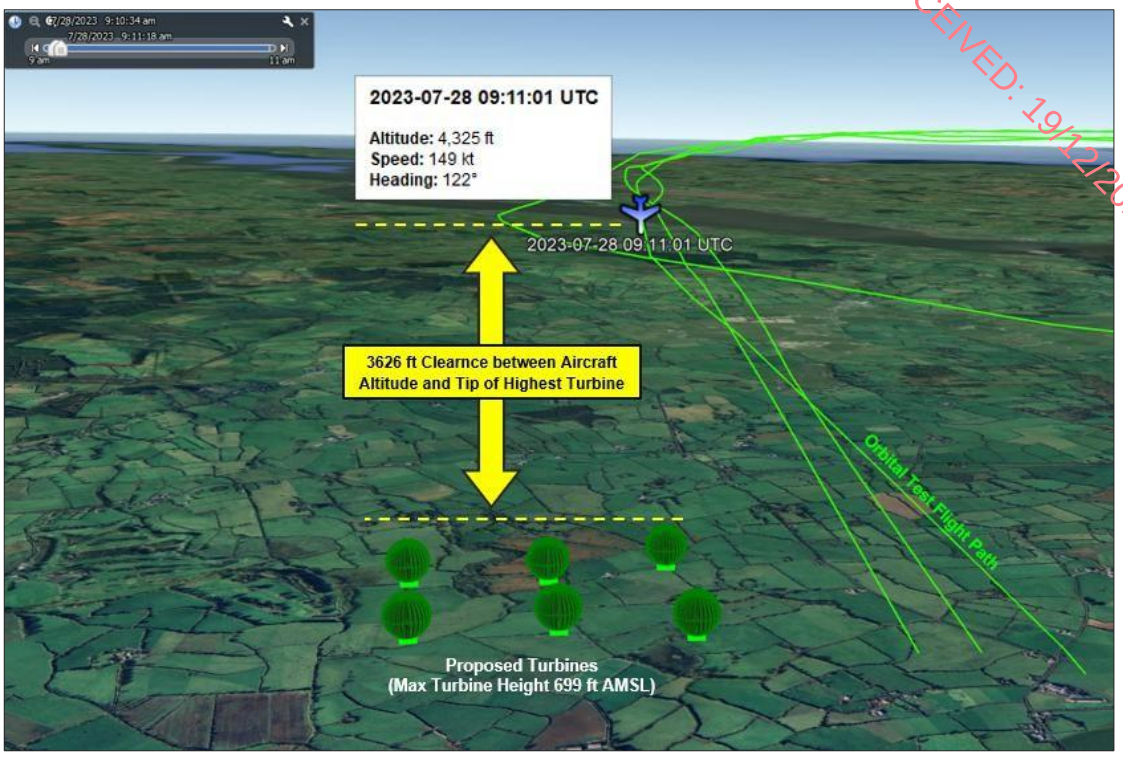

Figure 17. Inspection and Calibration Test Flight – July 2023

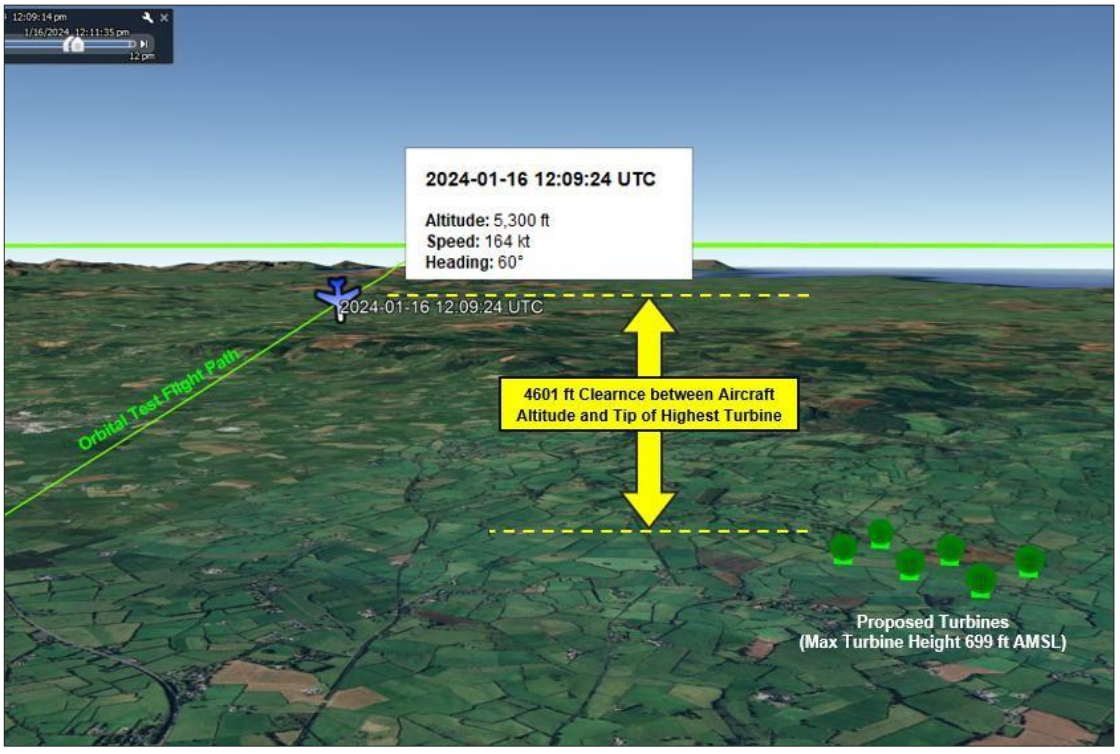

Figure 18. Inspection and Calibration Test Flight – January 2024

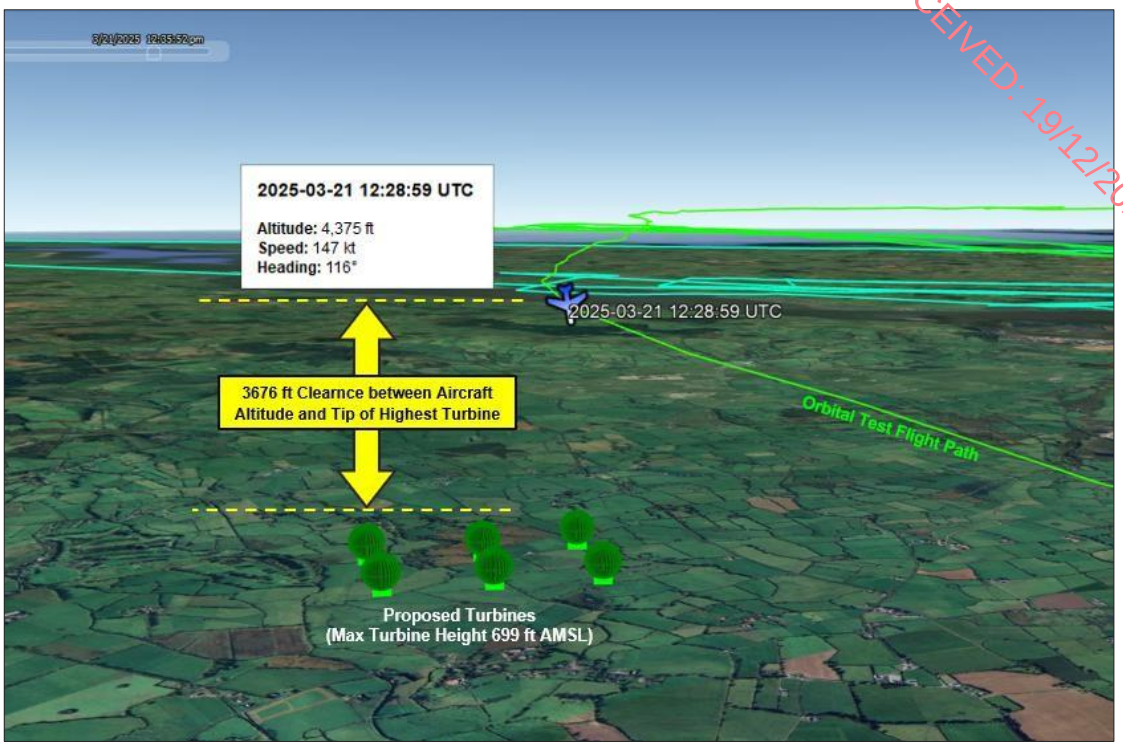

Figure 19. Inspection and Calibration Test Flight – March 2025

Date of Flight Inspection Test Flight	Clearnce Distance between Flight inspection & Calibration Test Aircraft and Proposed Turbines		Impacts on Flight Procedure
	Radial Test Flight	Orbital Test Flight	
28/07/23	> 10000 ft (Lateral Clearance)	> 3500 ft (Vertical Clearance)	No impacts
16/01/24	> 10000 ft (Lateral Clearance)	> 3500 ft (Vertical Clearance)	No impacts
21/03/25	> 10000 ft (Lateral Clearance)	> 3500 ft (Vertical Clearance)	No impacts

Table 10. Aviation Review - Flight Inspection and Calibration

3.8 Aeronautical Obstacle Warning Light Scheme

In the consultation response received from the IAA (Appendix A), it has been requested that

> "*in the event that planning consent is granted, the applicant should be conditioned to contact the IAA to agree an aeronautical obstacle warning light scheme for the wind farm development*."

It is recommended that lighting requirements should be in accordance with Chapter Q – Visual Aids for denoting Obstacles; CS ADR.DSN.Q.851 and GM.ADR.DSN.Q.851 (Pages 729/730) of the EASA Easy Access Rules for Aerodromes (Reg (EU) No. 139/2014) where it states that

> *"Applicability: When considered as an obstacle a wind turbine should be marked and/or lighted."*

4. Summary

A summary of the aviation review for the proposed wind farm is provided in Table 11 below.

Item	Impact	Summary
Annex 14 - Obstacle Limitation Surfaces (OLS)	No	**Outer Horizontal Surface:** The proposed turbines are located approximately 5 km outside the Outer Horizontal Surface.
	No	**Take-off and Approach Surfaces:** The proposed turbines are outside the take-off and approach surfaces.
Annex 15 - Aerodrome Surfaces	No	The proposed wind turbines would penetrate the ICAO Annex 15 Aerodrome Surface. All obstacles, if more than 100 meters above terrain for a distance of 45km from center point of Shannon Airport, need to be registered in the IAA Air Navigation Obstacle Data Set. It should be noted that other existing windfarms (e.g. Carrons and Grouselodge) are also located within the ICAO Annex 15 Aerodrome Surface and are already listed in the IAA Aeronautical Electronic Obstacle Data Sets.
Minimum Sector Altitudes (MSA)	No	A review of the Minimum Sector Altitudes (MSA) shows that the proposed wind turbines are within 25 nautical miles from the VOR/DME at Shannon Airport. The maximum allowable structure in the Main Sector is 2000ft (AMSL). The proposed turbines would not exceed the 2000ft threshold, therefore the MSA of the Main Sector will not be affected and there will be no impact on the published MSA altitude figures.
Instrument Flight Procedures	No	A review shows that the instrument flight procedures for RWY 06 approach and RWY 24 departure are unlikely to be impacted for precision aircraft.
Communication and Navigation Systems	No	As the proposed turbines are approximately 20km from the Localizer and transmitting antenna at Shannon Airport, it is very unlikely that the proposed wind turbines will have any impact on these ATS communications and radio navigational aids.
Radar Surveillance Systems Safeguarding	No	The proposed wind turbines would be located in Assessment Zone 4 (EuroControl guidelines) (SHN PSR/SSR) and a detailed Impact Assessment is not required.
Flight Inspection and Calibration	No	It is unlikely that the annual Flight Inspection Procedures will be impacted by the proposed turbines as the procedures should already account for the existing wind farms at Carrons and Grouselodge. In addition, analysis of flight data (from previous annual flight checks) show that during a test flight, there would be a clearance distance of at least 3600 ft between the proposed turbines and the test aircraft. At this distance, it is highly unlikely that there would be any impact on the flight inspection procedures.
Aeronautical Obstacle Warning Light Scheme	No	In the event that planning consent is granted, the applicant should be conditioned to contact the IAA to agree an aeronautical obstacle warning light scheme for the wind farm development.

Table 11. Ballynisky Wind Farm – Aviation Review Summary

APPENDIX A – IAA Response to Consultations

The Irish Aviation Authority's (IAA) response to the consultation request regarding the proposed wind farm is provided below.

Irish Aviation Authority
The Times Building
11–12 D'Olier Street
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1st August 2022

Ms. Valerie Heffernan
Malachy Walsh & Partners
The Elm Suite
Loughmore Centre
Raheen Business Park
Limerick
V94 R578

Reference: **Consultation for a Proposed Wind Energy Development near Kilcolman, Co Limerick.**
Applicant: **Ballynisky Green Energy Ltd.**

Description: The proposed development of a wind farm containing six (6) wind turbines, a substation and a grid connection in the townlands of Ballynisky, Ballyegny More, Lissatotan and Graigoor to the east of Kilcolman, Co. Limerick.

Dear Ms. Heffernan,

Thank you for your letter/scoping report and request for comments in relation to the proposed wind farm containing six (6) wind turbines (max tip height of 158m), substation and a grid connection in the townlands of Ballynisky, Ballyegny More, Lissatotan and Graigoor to the east of Kilcolman, Co. Limerick.

The development appears to be approximately 18km South West of Shannon Airport, as such, it is recommended that the developer engage directly with Shannon airport (including IAA-ANSP and Engineering) to make them aware of the proposal and ensure appropriate screening from an aviation safety perspective.

It is likely that the following general observations would be proffered by the Authority during a formal planning process: In the event of planning consent being granted, the applicant should be conditioned to contact the Irish Aviation Authority to: (1) agree an aeronautical obstacle warning light scheme for the wind farm development, (2) provide as-constructed coordinates in WGS84 format together with ground and blade tip height elevations at each wind turbine location and (3) notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection.

Yours sincerely

P.P. G. O'Leary

Deirdre Forrest
Corporate Affairs

APPENDIX B – Shannon Airport Group Consultations

The consultations between Ai Bridges Ltd and the Shannon Airport Group (SAG) are provide below.

22.11.22 – Email from AiBridges Ltd to SAG

From: Kevin Hayes
Sent: 22 November 2022 14:48
To: Cathal MacCriostail (IAA); Paul Hennessy (SAG)
Subject: [External] FW: Ballynisky - Communication with Shannon Airport

Dear Cathal, Paul

We are following up with you on behalf of the Environmental Planning Consultants, Malachy Walsh and Partners, concerning a proposed wind energy generation and storage development on lands at Ballynisky Co. Limerick. Malachy Walsh and Partners (MWP) have been engaged by the developers, Greensource Ltd., to consult with all stakeholders to whom the proposed development may be of interest or concern.

Ai Bridges Ltd have been commissioned by MWP to review the potential impacts to aviation safeguarding that would be of concern to the Irish Aviation Authority and to Shannon Airport Authority. We are thus engaging directly with your offices to assess the potential impact of this proposed development (incorporating utilisation of any cranes necessitated during construction) on Shannon Airport's flight procedures, communications, navigational aids, surveillance equipment as well as the safeguarding responsibilities of Shannon Airport Authority with respect to the obstacle limitation surfaces.

We have prepared and attached the Aviation Review Statement relating to Shannon Airport's flight procedures, communications, navigation and surveillance equipment including all aeronautical surfaces and which would incorporate the utilisation of any cranes necessitated during construction. We have included a summary below of our Review for your reference.

In respect of the standard IAA Aeronautical lighting requirements, we have referred to Chapter Q – Visual Aids for denoting Obstacles; CS ADR.DSN.Q.851 and GM.ADR.DSN.Q.851 (Pages 557/558) of the EASA Easy Access Rules for Aerodromes (Reg (EU) No. 139/2014) (see attached) where it states that "where lighting is deemed necessary in the case of a wind farm (i.e. group of two or more wind turbines), the wind farm should be regarded as an extensive object and lights should be installed.

We would be grateful if you could review the attached Aviation Review Statement Summary and advise if you are satisfied that the results of our study showing that it is highly unlikely that there will be any impacts to flight procedures, communications, navigation and surveillance at Shannon Airport .

We look forward to hearing from you at your earliest possible convenience as the planning application is being prepared for submission in the coming week

If you require any further information please do not hesitate to contact us.

Item	Impact	Summary
Annex 14 - Obstacle Limitation Surfaces (OLS)	No	**Outer Horizontal Surface:** The proposed turbines are located approximately 5 km outside the Outer Horizontal Surface.
	No	**Take-off and Approach Surfaces:** The proposed turbines are outside the take-off and approach surfaces.
Annex 15 - Aerodrome Surfaces	No	The proposed wind turbines would penetrate the ICAO Annex 15 Aerodrome Surface. All obstacles, if more than 100 meters above terrain for a distance of 45km from center point of Shannon Airport, need to be registered in the IAA Air Navigation Obstacle Data Set. It should be noted that other existing windfarms (e.g. Carrons and Grouselodge) are also located within the ICAO Annex 15 Aerodrome Surface and are already listed in the IAA Aeronautical Electronic Obstacle Data Sets.
Minimum Sector Altitudes (MSA)	No	A review of the Minimum Sector Altitudes (MSA) shows that the proposed wind turbines are within 25 nautical miles from the VOR/DME at Shannon Airport. The maximum allowable structure in the Main Sector is 2000ft (AMSL). The proposed turbines would not exceed the 2000ft threshold, therefore the MSA of the Main Sector will not be affected and there will be no impact on the published MSA altitude figures.
Instrument Flight Procedures	No	A review shows that the instrument flight procedures for RWY 06 approach and RWY 24 departure are unlikely to be impacted for precision aircraft.
Communication and Navigation Systems	No	As the proposed turbines are approximately 20km from the Localizer and transmitting antenna at Shannon Airport, it is very unlikely that the proposed wind turbines will have any impact on these ATS communications and radio navigational aids.
Radar Surveillance Systems Safeguarding	No	The proposed wind turbines would be located in Assessment Zone 4 (EuroControl guidelines) (SHN PSR/SSR) and a detailed Impact Assessment is not required.
Flight Inspection and Calibration	No	It is unlikely that the annual Flight Inspection Procedures will be impacted by the proposed turbines as the procedures should already account for the existing wind farms at Carrons and Grouselodge.
Aeronautical Obstacle Warning Light Scheme	Observation	It is likely that the IAA will request that the wind turbines would be fitted with Aeronautical Obstacle Warning Lights in accordance to lighting requirements for wind turbines in accordance with Chapter Q – Visual Aids for denoting Obstacles; CS ADR.DSN.Q.851 and GM.ADR.DSN.Q.851 (Pages 557/558) of the EASA Easy Access Rules for Aerodromes (Reg (EU) No. 139/2014)

Best Regards,
Kevin Hayes,
Ai Bridges Ltd.,

22.11.22 – Email from SAG to AiBridges Ltd

From: Paul Hennessy (SAG)
Sent: 23 November 2022 19:09
To: Kevin Hayes
Cc: Cathal MacCriostail (IAA)
Subject: RE: [External] FW: Ballynisky - Communication with Shannon Airport

Hi Kevin,

We note the aviation review statement summary for Ballyinsky wind farm. We will review and revert with any comments.

Just for information, In respect of the standard IAA Aeronautical lighting requirements, you have referred to Chapter Q – Visual Aids for denoting Obstacles; CS ADR.DSN.Q.851 and GM.ADR.DSN.Q.851 (Pages 557/558) of the EASA Easy Access Rules for Aerodromes (Reg (EU) No. 139/2014). There is a new version of the Easy Access Rules for Aerodromes published since August 2022 and you may wish to update your file copy. I have attached a PDF version for your information. Details on CS ADR-DSN.Q.851 Marking and lighting of wind turbines are now found on Pages 729 &730.

Best Regards,
Paul

APPENDIX C - ICAO Annex 15 Area 1 Surface.

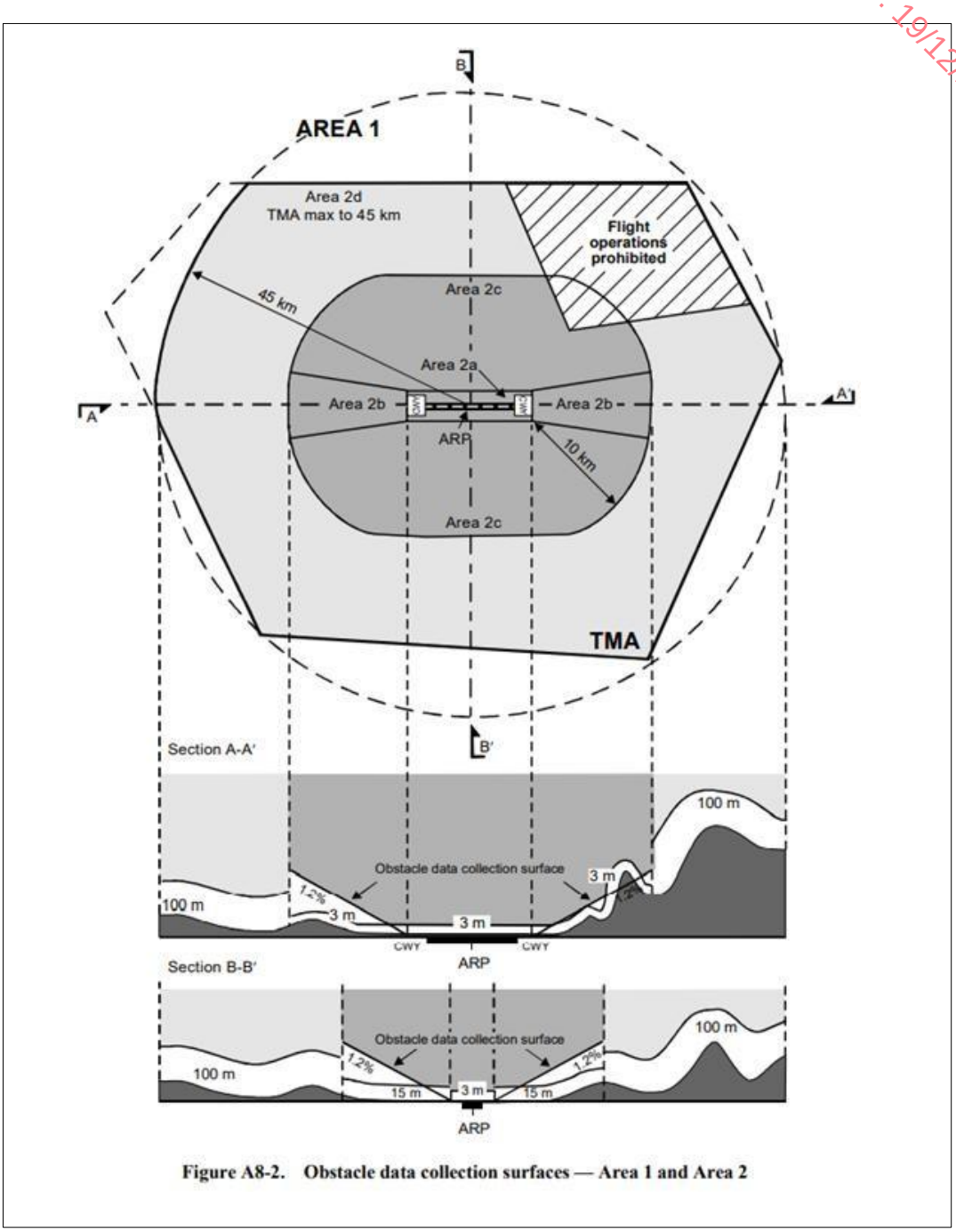

Figure A8-2. Obstacle data collection surfaces — Area 1 and Area 2

ICAO Annex 15 Area 1 Surface.