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An Coimisiún Pleanála

Report



Independent Aviation Review

Cloonkett Wind Farm

F. Binning

17 August 2026

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1 Introduction

1.1 Background

Cloonkett Green Energy Ltd (the Applicant) are proposing the development of the Cloonkett Wind Farm Development (the "Development") consists of fourteen (14) Wind Turbine Generators (WTG's) distributed across a site wholly located in County Clare and includes lands in the townlands of Carrowreagh East, Cloondrinagh, Cloonkett, Burrenfadda, Shessiv, Craghera, and Glenconaun More. The site is located approximately 19 km south-west of Ennis, approximately 20 km north-east of Kilrush and approximately 14 km west of Shannon Airport.

1.2 Requirement

An Coimisiún Pleanála ("the Client") is the independent body responsible for deciding on direct applications and appeals from planning decisions made by local authorities in Ireland, such as the Development. The Client have requested Sagentia Aviation conduct and document an independent review of the evidence provided to date that relates to aviation, which will assist the Client with their ability to reach an informed decision regarding the wind farm appeal.

1.3 About Sagentia Aviation

Sagentia Aviation is a leading aviation consultancy specialising in operational and engineering support to both civil and military projects. We are an established, independent aviation consultancy, part of Sagentia, a science and technology business which enables us to deliver a unique blend of operational, engineering and safety capabilities across both the civil and military domains.

Sagentia Aviation's independence within the aviation sector is relied upon by operators, system suppliers, service providers, government departments and the regulatory community alike. As such we are trusted to consistently deliver the highest quality outputs across this safety-critical sector.

We support UK airports, Windfarm Developers and Platform Operators with complex projects providing innovative technical support and impartial advice on safe operation. We are members of the Airport Operators Association, and a CAA Approved Procedure Design Organisation.

Sagentia Aviation supports Front Line Commands, Defence Equipment and Support (DE&S) and Defence Regulators with specialised safety assurance and procurement advice.

Why Sagentia Aviation?

- Team of aviation experts with blend of military and civilian backgrounds
- Quality of output assured by an established business
- Agility and independence of SME combined with the reassurance of a high-quality level of support and governance as part of a larger group
- 25 years' experience providing support in the aviation sector
- Breadth of science and technology capabilities through our sister companies in Sagentia

1.4 Purpose of this Document

This document aims to provide an independent review of the aviation evidence presented to the Client by the Applicants and respondents involved in assessing this application.

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2 Information Reviewed

The Client provided the following documents/ information to be the subject of the Independent Review conducted by Sagentia Aviation.

Reference ID.	Title	Reference	Version	Issue Date	Originator
{Ref.1}	Environmental Impact Assessment Report (EIAR) for the Proposed Cloonkett Wind Farm, Co. Clare.	Volume 1 - Non-Technical Summary		September 2025	Fehily Timoney
{Ref.2}		Volume 2 - Main EIAR Chapter 1 - Introduction		September 2025	Fehily Timoney
{Ref.3}		Volume 2 - Main EIAR Chapter 16 - Material Assets, Telecommunications and Aviation		September 2025	Fehily Timoney
{Ref.4}		Volume 3 - Appendices APPENDIX 16 Material Assets, Telecommunications and Aviation APPENDIX 16.1 Cloonkett Wind Farm Aviation Review Statement		September 2025	Ai Bridges Ltd
{Ref.5}	Irish Aviation Authority Submission	Strategic Infrastructure Development (SID) Planning Application- Cloonkett Wind Farm project – Co Clare		7th October 2025	IAA
{Ref.6}	Department of Defence Response	ACP ref. PAX03.323783		21st October 2025	DoD
{Ref.7}	AirNav Ireland Response	Case ref No: PAX03. 323783 Cloonkett Green Energy ltd.		13th November 2025	AirNav Ireland
{Ref.8}	Shannon Airport Response	Response to Cloonkett Wind farm (Cloonkett Green Energy Ltd.), Cranny, Co. Clare		25th November 2025	Shannon Airport
{Ref.9}	Cloonkett Wind Farm Response To Submissions	Response to Submissions received by ACP, ACP Ref. PAX03.323783	P26014-FT-XX-XX-RP-PL-0001	February 2026	Fehily Timoney

Table 1 - Client Provided Information

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3 Independent Review

3.1 Approach

Sagentia Aviation have conducted thorough review of the information made available by the Client. This review included an appraisal of the Applicant's Response to Submissions received by the Client {Ref.9}.

The review provided Sagentia Aviation with a comprehensive and rounded understanding of the technical background for the case.

The reader shall note that whilst Sagentia Aviation has appraised the information provided, Sagentia Aviation has not assessed the exact methodologies applied and results obtained of technical assessments completed (other than to confirm that the approach, outcomes and conclusions are reasonable in the context applied). Likewise, Sagentia Aviation cannot confirm the accuracy of any statements regarding communications and consultations undertaken, other than as contained within the information provided as listed in Section 2.

Note: To aid context, extracts from reference material may be quoted in this document. For ease of readability, where used, these quotes are formatted in Times New Roman Italic font coloured blue, and enclosed in quotation marks, as shown in the following example: *"I am an example quote extracted from reference material"*.

The reader should note that reference text has been extracted verbatim and may contain typographical errors, these have not been corrected to ensure that the extract remains original.

The review presented in this document has been structured in a logical manner based on the chronological submission of evidence as presented (note, a significant amount of evidence provided to Sagentia Aviation is contained within the Environmental Impact Assessment Report (EIAR) for the Cloonkett Wind Farm, specifically Chapter 16 {Ref.3} and Appendix 16 {Ref.4}, the latter of which is an Aviation Review produced by Ai Bridges and which is heavily referenced in the Applicants later response {Ref.9}.

Section 3 details the Independent Review conducted and provide Extracts, AirNav Reponses (where applicable) and Sagentia Aviation summaries for each of the key evidence as follows:

- 3.3 Appendix 16.1 Cloonkett Wind Farm Aviation Review Statement {Ref.4}
- 3.4 Irish Aviation Authority Submission 7th Oct 2025 {Ref.5}
- 3.5 Department of Defence Submission 21st Oct 2025 {Ref.6}
- 3.6 AirNav Submission 13th Nov 2025 {Ref.7}
- 3.7 Shannon Airport Submission 25th Nov 2025 {Ref.8}
- 3.8 Applicant Response Feb 2026 {Ref.9}

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3.2 EIAR Chapter 16 - Material Assets, Telecommunications and Aviation Sep 2025 {Ref.3}

Section 3.2 provides an abstract of the report along with key responses and Sagentia Aviation's summary of the artifact.

3.2.1 Report Abstract

- Executive Summary Extract

  "This Chapter describes Material Assets and Utility Infrastructure, Telecommunications and Broadcasting and Aviation that might potentially be affected by the Proposed Development. The potential effects 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. This chapter assesses:

  • Material Assets and Utilities (Gas, Water, Electricity Cables etc.);

  • Telecommunications & Broadcasting; and

  • Aviation."

- Conclusion Extract

  "This chapter of the EIAR assessment describes the methodology used in assessing the potential effects from the Proposed Development, and, as such, has considered Material Assets and Utilities, Telecommunications and Broadcasting and Aviation as stand alone sections within this EIAR chapter, with this chapter compiled in line with Consultation and Methodology and Relevant Policy and Guidance,…"

3.2.2 Sagentia Aviation Summary

As part of the Applicant EIAR submission, the Applicant commissioned an Aviation Review of the development. The Aviation Review was undertaken by Ai Bridges Ltd, documented as Appendix 16.1 Cloonkett Wind Farm Aviation Review Statement (see Section 1.1) within Appendix 16 - Material Assets, Telecommunications and Aviation to the EIAR body of evidence. The aviation areas considered were:

- Annex 14 -Obstacle Limitation Surfaces (OLS)
- Annex 15 - Aerodrome Surfaces
- Building Restricted Areas (BRA)
- Minimum Sector Altitudes (MSA)
- Instrument Flight Procedures (IFP)
- Communication and Navigation Systems (CNS)
- Shannon Primary Surveillance Radar (PSR)
- Shannon SSR (Secondary Surveillance Radar)
- Woodcock Hill SSR
- Flight Inspection and Calibration
- Aeronautical Obstacle Warning Light Scheme
- Irish Air Corps / Department of Defence (DoD) Safeguarding
- Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS)

Within Chapter 16 of the EIAR {Ref.3}, the Applicant provides a summary of aviation impacts in Table 16-4, for brevity this has been extracted in Table 2 below:

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Item	Impact	Summary
Annex 14 – Obstacle Limitation Surfaces (OLS)	Subject to ANSP Review (T14 Unlikely to cause Impact)	One of the proposed turbines (T14) at Cloonkett would be located inside the Outer Horizontal Surface (OHS). However, it should be noted that there are existing obstacles within the OHS and are marked on the IAA Air Navigation Obstacle Data Set (i.e. the chimneys at Aughinish Alumina).
Annex 15 – Aerodrome Surfaces	Observ.	The IAA are likely to request that turbines at the proposed wind farms be included in the IAA Aeronautical Electronic Obstacle Data Sets
Building Restricted Areas (BRA)	None	A review shows that Cloonkett is over 7 km from the BRAs at Shannon Airport. At this distance there would be no impacts due to the proposed wind farm.
Minimum Sector Altitudes (MSA)	None	A review of the Minimum Sector Altitudes (MSA) shows that the proposed wind farm is within 25 nautical miles from the VOR/DME at Shannon Airport. The maximum allowable structure in the applicable sector is 2000 ft above mean sea level (AMSL).
Instrument Flight Procedures	Observ.	A review shows that the instrument flight procedures for RWY 24 standard instrument departures may need to be assessed by the ANSP. Shannon Airport Authority \ IAA are likely to require a detailed assessment on the possible impact of turbines on the departure flight procedures for Runway 24
Communication and Navigation Systems	None	As the proposed wind farm is approximately 13 km from the Localizer and transmitting antenna at Shannon Airport, it is very unlikely that the proposed development will have any impact on these ATS communications and radio navigational aids.
Shannon PSR	Observ.	It has been identified that four of the proposed turbines would be within EuroControl Assessment Zone 2 for PSR. A detailed technical assessment was conducted against the proposed development. There are existing precedents of wind turbines that are within similar distances of PSR radars against which there are no impacts.
Shannon SSR	None	Nine of the proposed turbines would be located within 16 km of the SSR at

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Item	Impact	Summary
		Shannon Airport. However, a review shows that reflected radar signals from the proposed turbines are unlikely to be detectable by an airborne transponder. It should also be noted that there are existing wind farm precedents that are located within 16 km of SSR radar stations (e.g. Carrownagowan, Fahy Beg and Boolyngleragh, Lackeragh) for which there are no impacts.
Woodcock Hill SSR	None	All of the turbines at the proposed development would be more than 16 km from the SSR and would be in Assessment Zone 4 (Eurocontrol Guidelines). i.e. No Assessment required.
Flight Inspection and Calibration	Observ	A review of the Flight Inspection Procedures indicates that there will be no impacts due to the proposed wind farm. However, the IAA may request that their Flight Inspection Service Provider (FCSL) be contacted so that they can assess the proposed development.
Aeronautical Obstacle Warning Light Scheme	Observ	It is possible that the IAA may request that the wind farm, if permitted, would be fitted with Aeronautical Obstacle Warning Lights in accordance with industry standards. Subject to further consultation with the IAA
Irish Air Corps / DoD Safeguarding	None	The proposed wind farm is located outside the Irish Air Corps Restricted Areas
Garda Air Support Unit and Emergency Aeromedical Service	None	An assessment of GASU and EAS operations indicates that they are unlikely to be impacted by the proposed wind farm development.

Table 2 - EIAR Chapter 16 (Table 16-4) Extract

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3.3 Appendix 16.1 Cloonkett Wind Farm Aviation Review Statement {Ref.4}

Section 3.3 provides an abstract of the report along with key responses and Sagentia Aviation's summary of the artifact.

3.3.1 Report Abstract

- Executive Summary Extract

  "Ai Bridges Ltd have been commissioned to review the possible impacts of the proposed wind farm on aviation systems in the vicinity of the proposed wind farm development at Cloonkett. As part of the review, the following subjects were considered:

  - Annex 14 – Obstacle Limitation Surfaces (OLS)
  - Annex 15 – Aerodrome Surfaces
  - Building Restricted Areas (BRA)
  - Minimum Sector Altitudes (MSA)
  - Instrument Flight Procedures
  - Permitted Wind Farms in vicinity of Proposed Wind Farm
  - Communications, Navigation and Radar Surveillance Systems Safeguarding
  - Flight Inspection and Calibration
  - Aeronautical Obstacle Warning Light Scheme
  - Irish Air Corps / Department of Defence Safeguarding
  - Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS)."

- Conclusion Extract

  "The windfarm does impact to the current published IFPs for Shannon Airport but is only limited to the ATC Surveillance Minimum Altitude Chart. Although a full IFP assessment is normally required for any identified impact, it is recommended to submit this report to the IAA for consideration whether a full assessment is required."

3.3.2 Sagentia Aviation Review

3.3.2.1 (2.1) Annex 14 - Obstacle Limitation Surfaces (OLS)

Ai Bridges Approach

Ai Bridges undertook a review of the Annex 14 Obstacles Limitation Surfaces (OLS) by plotting the proposed turbines and the airport obstacle surfaces.

Ai Bridges Conclusion

"The analysis of the OLS plots indicates that one of the proposed wind turbines (T14) would penetrate the Outer Horizontal Surface which extends to 15 km from the Shannon Airport Reference Point (ARP) or runway centre-point"

"This may require a further technical assessment as T14 would be considered an obstacle within the containment area of the outer horizontal surface (OHS). It should be noted that there are precedents where there are turbines located within the OHS of an airport, Code 4 runway, obstacle surfaces"

Sagentia Aviation Observations

The Ai Bridges approach and conclusions are reasonable and proportional for providing an initial indication of likely impacts. The decision for whether a further technical assessment of T14 should rest with Shannon Airport.

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3.3.2.3 (2.2) Annex 15 - Aerodrome Surfaces

Ai Bridges Approach

Ai Bridges undertook a review of the Aerodrome Surface by plotting the proposed turbines in relation to a 45km radius from the Shannon Aerodrome Reference Point (ARP) as required by the ICAO Annex 15.

Ai Bridges Conclusion

> *"As the proposed wind farm is less than 45 km from the ARP at Shannon Airport, there is penetration of the Annex 15 surface. All obstacles, if they are more than 100 meters above terrain for a distance of 45 km from Shannon ARP, need to be registered in the IAA Air Navigation Obstacle Data Set"*
>
> *"Although there are other obstacles in close proximity to the proposed wind farm, all new 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."*

Ai Bridges conclude that *'The proposed wind turbines would be required to be included in the IAA Obstacle Data Set"*

Sagentia Aviation Observations

The aviation review correctly confirms that the wind turbines are required to be included in the IAA Aeronautical Electronic Obstacle Data Sets.

3.3.2.4 (2.3) Building Restricted Areas (BRA)

Ai Bridges Approach

Building Restricted Areas are defined as virtual 2D/ 3D volumes around Communications Navigation and Surveillance (CNS) systems. The purpose of BRAs is to identify developments with the potential for causing unacceptable interference to the respective CNS systems.

Ai Bridges conducted an assessment of the applicable BRAs of Shannon Airport's ILS Localisers, Glidepaths and Distance measuring Equipment (DME) in accordance with the ICAO EUR DOC 015.

Ai Bridges Conclusion

Ai Bridges conclude *"that the proposed wind farm at Cloonkett is over 7 km from the nearest BRA at Shannon Airport. At this distance, turbines at the proposed wind farm will have no impact on the navigation facilities associated with the Building Restricted Areas for Shannon Airport"*

Sagentia Aviation Observations

The Ai Bridges approach and conclusions are reasonable and proportional for providing BRA assessments. However, BRA assessments are only one element of technical assessments to be considered when safeguarding CNS systems.

3.3.2.5 (2.4) Minimum Sector Altitudes (MSA)

Ai Bridges Approach

Ai Bridges conducted a review of Shannon Airports Minimum Sector Altitudes and identified that the Cloonkett wind farm is located in the 3,000ft sector.

Ai Bridges Conclusion

Ai Bridges conclude that *"A 492ft (150m) turbine located at the highest point (374ft) within the proposed site boundary would result in an obstacle of 866ft AMSL. This is below 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"*

Sagentia Aviation Observations

The Ai Bridges approach and conclusions are reasonable and proportional.

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3.3.2.6 (2.5) Instrument Flight Procedures

Ai Bridges Approach

Ai Bridges conducted an assessment of nine (9) published Instrument and Visual Flight Procedures for departures and arrivals into Shannon Airport.

Ai Bridges Conclusion

"The proposed wind farm is relatively near the departure flight path to UNBEG and could be a concern for the airport operator. However, preliminary climb altitude calculations indicate that aircraft abiding by the flight rules should have sufficient altitude by the time they fly over the wind farm that there will be no issues"

"The flight path from the end of Runway 24 to the wind farm is 13500m. Calculations indicate that the obstacle clearance altitude over the proposed wind farm is over 500ft above the highest turbine. As there is no infringement, there should be no changes to the published obstacle climb gradient required"

"The review indicates that the flight procedures would not be impacted; however, the IAA are likely to require a detailed Technical Analysis to assess any possible impacts."

Sagentia Aviation Observations

Whilst Ai Bridges presents a reasonable review of likely IFP impacts, it is Sagentia Aviation's understanding that Ai Bridges are not an IAA Approved Procedure Design Organisation (APDO). As such it should be recognised (and as also concluded by Ai Bridges) that this review should be treated as information only and only as a guide to the Applicant of whether a formal IFP assessment conducted by an IAA APDO is likely to be required.

3.3.2.7 (2.6) Permitted Wind Farms in vicinity of Proposed Wind Farm

Ai Bridges Approach

Ai Bridges present a list of planning references for other permitted Wind Farms *"in the vicinity"* of the proposed wind farm.

Ai Bridges Conclusion

Ai Bridges conclude that *"None of these wind farms required a Full Assessment of Instrument Flight Procedures."*

Sagentia Aviation Observations

Sagentia Aviation do not see what relevance that this section of the Aviation Review makes it pertinent in the perspective of Cloonkett. It is difficult to quantify how the conclusion presented relates to Cloonkett wind farm, whilst the developments listed may be geographical close to Cloonkett, Ai Bridges do not provide geographic context. Even if it was provided the requirement for full IFP assessments and any subsequent impacts identified are related to the geographic position of a development in relation to an airport's procedures, along with the maximum design envelope (quantity, size, position and ground level) proposed for a developments wind turbines.

3.3.2.8 (2.7) Communication and Navigation Systems

Ai Bridges Approach

Ai Bridges have reviewed the AIP document EINN AD 2-18/19 which provides the information for CNS facilities for Shannon Airport. Ai Bridges have then presented basic spectrum (Frequency) ranges for the CNS equipment along with an approximate distance to CNS antennas of 14km to the Cloonkett wind farm.

Ai Bridges Conclusion

"As the proposed wind farm is approximately 14 km from the Localizers and transmitting antennas, it is very unlikely that turbines at the proposed wind farm 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"

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Sagentia Aviation Observations

Wind farms even when outside the respective BRA can present issues to both ILS, VHF communication and navigation systems such as VOR. These impacts can include signal in space inference, signal blocking which could affect RF coverage and carrier interference degradation to the quality of VHF communications. Ai Bridges indicate that impacts are very unlikely due to range, whilst this may be a reasonable assumption for an initial guide to the Applicant, it cannot be considered as either a qualitative or a quantitative statement.

Shannon Airport/ AirNav may require further technical assessments of impacts to its CNS so that it can conduct an operational impact appraisal as part of its mandated safeguarding responsibilities.

3.3.2.9 (2.10) Shannon PSR

Ai Bridges Approach

Ai Bridges assessed that four (4) of the fourteen (14) wind turbines would fall into the 15km Detailed Assessment Eurocontrol guidelines. These 4 wind turbines were then assessed and confirmed to have Radio Line of Site (RLOS) to the Shannon Airport PSR.

Radio planning software was also used to predict the Probability of Detection of each of the 14 proposed turbines by the PSR at Shannon

Ai Bridges Conclusion

Ai Bridges concluded that all 14 wind turbines would likely be detectable by Shannon Airport's PSR; *"The results indicate that it is likely that each of the proposed turbines at Cloonkett would be detectable by the PSR radar station at Shannon Airport"*

Ai Bridges summarise their findings in table 18 (extracted below):

Aviation Impact Review	Observations	Mitigation Measure Action	Residual Impact
Shannon Primary Surveillance Radar	Four of the proposed turbines would be within 15km of the PSR and are likely to be detectable by the PSR. However there are existing precedents of wind farms developments that within similar distances of PSR radars where assessments have not been required.	Based on existing wind farm precedents mitigation measures will not be required	None

Sagentia Aviation Observations

Following the Eurocontrol guidelines Ai Bridges have correctly identified that 4 of the wind turbines may require a Detailed Assessment. The remaining ten (10) wind turbines may only be required to have a Simple Assessment conducted.

The Observations and Mitigation Measures presented in Table 18 make a claim that *"there are existing precedents of wind farms developments that within similar distances of PSR radars where assessments have not been required' and 'Based on existing wind farm precedents mitigation measures will not be required".*

Ai Bridges claim existing wind farm precedents; however, they do not provide any specific evidence. It is not a valid argument to claim that mitigation measures will not be required based on similar distances to other wind farms only, as the exact terrain profiles from point to point between a radar and a wind turbine will differ, where some profiles of previous wind farms may have reduced impacts to an acceptable level through terrain shielding. Additionally, it is Shannon Airport's responsibility to fully assess technical impacts to its CNS and where required to conduct operational impact assessments against the ATS it provides.

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3.3.2.10 (2.11) Shannon SSR

Ai Bridges Approach

Ai Bridges assessed that nine (9) of the fourteen (14) wind turbines would fall into the 16km radius which under EuroControl guidelines would require a Detailed Assessment. These 9 wind turbines were then assessed and confirmed to have Radio Line of Site (RLOS) to the Shannon Airport SSR.

Radio planning software has also been used to predict the likelihood that radar signals reflected from the proposed turbines would be detectable by an airborne radar transponder.

Ai Bridges Conclusion

Ai Bridges concluded that *"the preliminary SSR interference analysis results indicate that level of bistatic reflections (radar multipath interference) due to the proposed turbines is likely to be small and would be below the threshold that is detectable by airborne transponders"*

Ai Bridges also concluded that *"the EUROCONTROL Guidelines indicate that a detailed radar assessment would be recommend for nine of the proposed turbines to assess their potential impact on the Secondary Surveillance Radar at Shannon Airport' and 'It should also be noted that there are multiple existing wind farms that are located within 16 km of IAA SSR radar stations"*

A summary (table 20 extracted below)) is presented which details the Range, likely RLOS, EuroControl Assessment Required and Review Observations for each of the 14 wind turbines.

ID	Distance to SSR	In Radar LOS (Y/N)	Radar Assessment (EuroControl Guidelines)	SSR Review Observations (Subject to Confirmatory Analysis)
T01	> 16 km	Y	Detailed Assessment Not Required	Detailed Assessment Not Required
T02	> 16 km	Y	Detailed Assessment Not Required	Detailed Assessment Not Required
T03	> 16 km	Y	Detailed Assessment Not Required	Detailed Assessment Not Required
T04	> 16 km	Y	Detailed Assessment Not Required	Detailed Assessment Not Required
T05	> 16 km	Y	Detailed Assessment Not Required	Detailed Assessment Not Required
T06	16.0 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder
T07	15.8 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder
T08	15.5 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder
T09	15.3 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder
T10	15.0 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder
T11	14.9 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder
T12	15.1 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder
T13	14.5 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder
T14	14.1 km	Y	Detailed Assessment completed	Reflected Radar Signals unlikely to be detectable by airborne transponder

Note: the header of last column in table 20 suggests that the results are *"subject to confirmatory analysis"*, this is also referenced earlier in the SSR section where *"the calculated maximum reflection range* for each of the nine turbines"* is also stated to be *"subject to confirmatory analysis"*.

Ai Bridges summarise their findings in table 21 (extracted below):

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Aviation Impact Review	Observations	Mitigation Measure Action	Residual Impact
Shannon Secondary Surveillance Radar	Nine of the proposed turbines would be located within 16 km of the SSR at Shannon Airport. However, a review shows that reflected radar signals from the proposed turbines are unlikely to be detectable by an airborne transponder.	None	None

Sagentia Aviation Observations

Ai Bridges state that a EuroControl SSR *"Detailed Assessment"* has been completed for 9 of the wind turbines. EuroControl specify the following requirements that shall be included, as a minimum for detailed SSR assessment:

- SSR Probability of detection and probability of Mode A and Mode C code detection
- SSR false target reports
- SSR 2D position accuracy

Ai Bridges claim that a detailed EuroControl SSR Detailed Assessment has been conducted against the 9 wind turbines within 16km of the Shannon Airport SSR, yet only present findings of a Multiple Target Report calculations against which they also state that the results are subject to *"confirmatory analysis"*. There is no reference to SSR Probability of detection or 2D position accuracy which form the minimum basis of a Detailed Assessment.

Ai Bridges also state that *'It should also be noted that there are multiple existing wind farms that are located within 16 km of IAA SSR radar stations"*. Again, without specific context, this statement provides no validity to the arguments presented.

Furthermore, in their summary, they conclude that no Mitigation Measure Actions, or Residual Impacts are identified.

There very well may be no impacts, but as a complete and verified Detailed Assessment conducted against the EuroControl requirements has not been conducted, and reviewed by Shannon Airport/ AirNav for operational impacts, it is difficult to quantify how the claim that no mitigation measures are required or no residual impacts exist can be substantiated.

3.3.2.11 (2.12) Woodcock Hill SSR

Ai Bridges Approach

Ai Bridges have measured the range of each wind turbine relevant to the Woodcock Hill SSR radar.

Ai Bridges Conclusion

As each wind turbine is greater than 16km to the Woodcock Hill SSR, in accordance with the Eurocontrol assessment zone guidance, a Detailed Assessment is not required.

Sagentia Aviation Observations

The Ai Bridges approach and conclusions are reasonable and aligned with the EuroControl guidance for assessing SSR impacts from a wind farm.

3.3.2.12 (2.13) Flight Inspection and Calibration

Ai Bridges Approach

Using publicly available FCSL Inspection/Calibration flights from June and July 2023, Ai Bridges have plotted the flight paths in relation to the Cloonkett wind farm.

Ai Bridges Conclusion

Ai Bridges present the flight calibration aircraft on its orbital flight around Shannon Airport. They conclude that *"The altitude of the aircraft as it passes to the east of the proposed wind farm is 3875 ft. This distance is over 3000 ft higher than the nearest of the proposed turbines. At this distance it is highly unlikely that there would be any impact to the Inspection/ Calibration Test Flights"*

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Ai Bridges present the following mitigation measure action:

"No Mitigation Measure Actions are expected. However, the IAA / AirNav are likely to request that their Flight Inspection Service Provider (FCSL) be contacted so that they can assess the proposed development"

Sagentia Aviation Observations

The Cloonkett wind farm appears to be sufficiently distanced from the flight paths presented, as not to require a change in the standard flight check serials conducted during calibration to maintain Minimum Separation Altitude (MSA) above obstacles.

As Ai Bridges conclude, this should be checked with Flight Calibration Services Ltd (FCSL), the approved Flight Inspection Service Provider for Shannon Airport.

3.3.2.13 (2.14) Aeronautical Obstacle Warning Light Scheme

Ai Bridges Approach

"In the event of a grant of planning consent the IAA-ANSP would require the lighting of the proposed wind turbines in the interest of aviation safe-guarding as the proposed development may be considered as an en-route obstacle"

Ai Bridges Conclusion

Ai Bridges recommend *"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)"*

Sagentia Aviation Observations

Ai Bridges have recommended that the Applicant implement approved lighting scheme for the Cloonkett wind farm that meets the applicable regulatory requirements.

3.3.2.14 (2.15) Irish Air Corps / DoD Safeguarding

Ai Bridges Approach

Ai Bridges have reviewed and assessed the Irish Air Corps Position Paper "Air Corps Wind Farm/ Tall Structures Position Paper" published on 08th August 2014, this paper details restricted areas in which the IAC are likely to oppose the development of any wind farm or tall structures.

Ai Bridges Conclusion

Ai Bridges have assessed that as Cloonkett wind farm is located approximately 30km (16 NM) from the 3NM buffer surrounding the closest restricted area detailed by the Irish Air Corps which is motorway N/M7, that the wind farm should cause no impacts to the Irish Air Corps activities.

Sagentia Aviation Observations

The Ai Bridges approach and conclusions are reasonable and aligned with the guidance from the Irish Air Corps as extracted and presented in Appendix 16.1 {Ref.4}. Sagentia Aviation have not had visibility of the full guidance and would question as to whether any further updated information has been published since 2014.

3.3.2.15 (2.16) Garda Air Support Unit and Emergency Aeromedical Service

Ai Bridges Approach

Ai Bridges note that similar concerns to what the Irish Air Corps have raised (see Section 3.3.2.14 above) have been expressed by the Garda Air Support Unit (GASA) and Emergency Aeromedical Service (EAS) at recent wind farm development consultations.

Ai Bridges identify that both GASA and EAS aircraft (fixed wind and rotary) are air platforms equipped with modern communications systems and navigational equipment; and which are operated from bases some distance from Cloonkett wind farm.

Ai Bridges Conclusion

Ai Bridges argue that as GAS and EAS operate modern platforms and that the Cloonkett wind farm (which would be subject to an approved aeronautical lighting scheme and be clearly marked on

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aviation charts) is located in a sparsely populated region that is *"highly unlikely that the proposed wind farm development would have any significant impacts on GASU operations".* Additionally, *"the footprint of the proposed wind farm development is relatively small and any flight diversions for EAS operations would have negligible time impacts. For these reasons, turbines at the proposed wind farm should have no impact on EAS flights from Athlone"*

Sagentia Aviation Observations

The Ai Bridges approach and conclusions are reasonable and aligned with the guidance published by the Irish Air Corps which is believed to be similar to the concerns expressed by the GASA and EAS against recent wind farm consultations.

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3.4 Irish Aviation Authority Submission 7th Oct 2025 {Ref.5}

Section 3.4 provides an abstract of the submission letter along with Sagentia Aviation's summary of the artifact.

3.4.1 Letter Abstract

"The applicant should be required to engage with Shannon Airport Authority and the air navigation service provider AirNav Ireland to confirm that the proposed wind farm development and any associated cranes that would be utilised during its construction would have no impact on Obstacle Limitation Surfaces, Instrument Flight Procedures, Communications, Navigation and Surveillance (CNS) equipment or the safety of flight operations at Shannon Airport:

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 WGS-84 format together with ground and tip height elevations at each wind turbine location and:
(3) notify Shannon Airport Authority, AirNav Ireland and the Authority of intention to commence crane operations with at least 30 days prior notification of their erection in accordance with S.I 215 of 2005 Irish Aviation Authority (Obstacles to Aircraft in Flight) Order."

3.4.2 Sagentia Aviation Summary

The IAA's submission letter clearly sets out the requirement for the Applicant to *"engage with Shannon Airport Authority and the air navigation service provider AirNav Ireland to confirm that the proposed wind farm development and any associated cranes that would be utilised during its construction would have no impact on"* on a number of aviation issues.

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3.5 Department of Defence Submission 21st Oct 2025 {Ref.6}

Section 3.5 provides an abstract of the submission letter along with Sagentia Aviation's summary of the artifact.

3.5.1 Letter Abstract

"Following consultations with our Air Corps colleagues at Casement Aerodrome, the Department of Defence would like to make the following observations:

- *All turbines should be illuminated by Type C, Medium intensity, Fixed Red obstacle lighting with a minimum output of 2,000 candela to be visible in all directions of azimuth and to be operational H24/7 days a week.*
- *Obstacle lighting may be incandescent. If LED or other lighting types are used should be a type visible to Night Vision equipment.*
- *Obstacle lighting 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*
- *In the event of negative impacts on future military radar systems, the owner will engage with the Department of Defence and will provide suitable mitigations as soon as practical"*

3.5.2 Sagentia Aviation Summary

The DoD's submission letter clearly sets out the requirement for the Applicant to ensure that all wind turbines of the development are fitted with specific obstacle lighting. Additionally, the DoD lays down the requirement that *"In the event of negative impacts on future military radar systems, the owner will engage with the Department of Defence and will provide suitable mitigations as soon as practical"*

Whilst Sagentia Aviation understands the DoD's position, it is not clear how any binding agreement (other than to engage) can be placed on the Applicant as no tangible impacts have been identified as currently there is no DoD radar system in place.

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3.6 AirNav Submission 13th Nov 2025 {Ref.7}

Section 3.6 provides an abstract of the submission letter along with Sagentia Aviation's summary of the artifact.

3.6.1 Letter Abstract

"As the windfarm falls within the Shannon Airport Runway 06 Instrument Landing System coverage area, ANI Navaids require the developer to complete assessments of the windfarm effects on the following:

(1) Windfarm effects on ILS 06 guidance signals
(2) Windfarm effects on ILS 06 flight calibration

The assessment examining the windfarm effects on ILS 06 guidance signals should include windfarm structures computer modelling and associated signal effects computer simulations, if deemed necessary.

FCSL are an ANI approved company who possess the expertise required to complete both the signal effects and flight calibration assessments."

3.6.2 Sagentia Aviation Summary

AirNav's submission letter clearly sets out the requirement for the Applicant to assess the wind farm effects on both the ILS 06 guidance signals and the wind farm effects on the flight calibration activities. AirNav go on to assert that FCSL are approved and capable of conducting both assessments.

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3.7 Shannon Airport Submission 25th Nov 2025 {Ref.8}

Section 3.7 provides an abstract of the submission letter along with Sagentia Aviation's summary of the artifact.

3.7.1 Letter Abstract

"In general terms, the siting of wind turbines at this location may have implications for the operations of the communication, navigation and surveillance systems used by Air Nav Ireland for the separation and safety of aircraft. The geographical siting of these turbines may also have implications for the flight paths of aircraft."

"from our own internal assessment, this development of fourteen turbines will have no impact on the aerodrome Obstacle Limitation Surfaces (OLS). The development is not within the protection areas as per our safeguarding maps. As there is no penetration of the aerodrome OLS surfaces, it is unlikely that there will be any Annex 14 OLS impacts due to the proposed wind farm"

We are however aware from our colleagues in Air Nav Ireland (ANI) that the windfarm falls within the Shannon Airport Runway 06 Instrument Landing System (ILS) coverage area and that ANI Navaids have requested the developer to complete assessments of the windfarm effects on the ILS 06 guidance signals and on ILS 06 flight calibration. We fully support that request.

The assessments examining the windfarm effects on ILS 06 guidance signals should include windfarm structures computer modelling and associated signal effects computer simulations, if deemed warranted"

3.7.2 Sagentia Aviation Summary

Shannon Airport's submission letter clearly sets out that the Development falls within the ILS coverage area and as such states the requirement for the Applicant to assess the wind farm effects on both the ILS 06 guidance signals and the wind farm effects on the flight calibration activities and stipulate that computer modelling and associated simulations should be undertaken "*if deemed warranted*".

Furthermore, Shannon Airport also require that the Applicant shall liaise with the IAA and ensure that the wind turbines are included in the IAA Electronic Air Navigation Obstacle Dataset.

Additionally, Shannon Airport require that the wind turbines are subject to an aeronautical obstacle warning light scheme in accordance with the EASA aerodrome rules as the wind turbines would be regarded as an extensive object; and also reiterate that the Applicant must ensure that preapproval is gained from the Airport prior to crane operations during the construction phase of the development.

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3.8 Applicant Response Feb 2026 {Ref.9}

Section 3.8 provides an abstract of the Applicant's response to the submissions received by ACP from prescribed aviation bodies and Sagentia Aviation's summary of the artifact.

3.8.1 Report Abstract

- Executive Summary Extract

  "Fehily Timoney and Company is pleased to submit this Submissions Response Report to An Coimisiún Pleanála (ACP) for planning application ACP Ref. No. PAX03.323783, as initially issued by An Coimisiún Pleanála on the 22nd December 2025 and subsequently updated on 28th January to Cloonkett Green Energy Ltd"

- Conclusion Extract

  "In total there were four submissions from prescribed bodies in the Aviation sector.

  VII. AirNav Ireland
  VIII. Irish Aviation Authority
  IX. Department of Defence
  X. Shannon Airport

  Table 30 of Appendix 16.1 provides a summary of the aviation review undertaken for the proposed development. With respect to the items raised in the submissions from AirNav Ireland, Irish Aviation Authority, Department of Defence and Shannon Airport, Table 30 outlines:

  • The turbines will be included in the IAA Aeronautical Electronic Obstacle Dataset.
  • It is very unlikely that the proposed development will have any impact on communication and radio navigational aids.
  • There will be no impact to flight inspection procedures.
  • An aeronautical obstacle warning light scheme will be agreed with the IAA"

3.8.2 Applicant Response to the IAA Submission (see Section 3.4)

3.8.2.1 Applicant Response

"Both Shannon Airport and AirNav Ireland have provided submissions in relation to the proposed development. The applicant agrees to engage with Shannon Airport Authority and the air navigation service provider AirNav Ireland prior to commencement of construction. The purpose of this engagement is to confirm that the proposed wind farm development and any associated cranes that would be utilised during its construction would have no impact on Obstacle Limitation Surfaces, Instrument Flight Procedures, Communications, Navigation and Surveillance (CNS) equipment or the safety of flight operations at Shannon Airport as detailed in Chapter 16 (Vol II) of the EIAR.

Section 2.14 of Appendix 16.1 discusses the requirement of an aviation lighting scheme for the proposed development. If Planning consent is granted, the Applicant agrees to a condition of planning to contact the IAA to agree for the implementation of an aeronautical obstacle warning light scheme for the wind farm development.

The applicant notes that the 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." The applicant would provide as-constructed coordinates in WGS-84 format together with ground (AOD in meters), and tip height elevations at each wind turbine location.

The applicant is also accepting of the condition to notify Shannon Airport Authority, AirNav Ireland and the Authority of intention to commence crane operations with at least 30 days prior notification of their erection in accordance with S.I 215 of 2005 IAA (Obstacles to Aircraft in Flight) Order."

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3.8.2.2 Sagentia Aviation Summary

In Section 2.14 of Appendix 16.1 of the EIAR {Ref.4}, the Applicant agrees to a condition of planning to contact the IAA to agree for the implementation of a regulatory approved aeronautical obstacle warning light scheme for the wind farm development; along with the requirement to provide as-constructed coordinates in WGS-84 format together with ground (AOD in meters), and tip height elevations for each wind turbine location.

The applicant is also accepting of the condition to notify Shannon Airport Authority, AirNav Ireland and the Authority of intention to commence crane operations with at least 30 days prior notification of their erection in accordance with S.I 215 of 2005 IAA (Obstacles to Aircraft in Flight) Order.

In their response {Ref.9} the applicant *"agrees to engage with Shannon Airport Authority and the air navigation service provider AirNav Ireland prior to commencement of construction. The purpose of this engagement is to confirm that the proposed wind farm development and any associated cranes that would be utilised during its construction would have no impact on Obstacle Limitation Surfaces, Instrument Flight Procedures, Communications, Navigation and Surveillance (CNS) equipment or the safety of flight operations at Shannon Airport"*

This engagement should be bounded in a form of condition, specifically the Applicant agrees to engage with the authorities to confirm if the Development impacts upon the Airports CNS (which includes the ILS systems). If impacts are found, then the only likely mitigation is a reduction in the Developments design envelope (no. of wind turbines, reduction in maximum tip height etc.).

3.8.3 Applicant Response to the DoD Submission (see Section 3.5)

3.8.3.1 Applicant Response

"The applicant notes the submission of the DOD and if planning consent is granted, the Applicant agrees to a condition of planning to engage with the DOD to agree for the implementation of an aeronautical obstacle warning light scheme for the wind farm development, including the illumination and type of lighting to be installed. In the event of any negative impacts on future military radar systems as a result of the proposed development, the applicant confirms that consultation will be undertaken with the relevant aviation stakeholders, to agree suitable mitigations.

The Appicant also notes that any Irish Air Corps (IAC) requirements are separate to Irish Aviation Authority (IA) requirements."

3.8.3.2 Sagentia Aviation Summary

In their Response to Submissions {Ref.9}, the Applicant agrees to a condition of planning to engage with the DoD to agree for the implementation of an aeronautical obstacle warning light scheme for the wind farm development, including the illumination and type of lighting to be installed.

The Applicant also agrees to consult with relevant aviation stakeholders should any negative impacts on future military radar systems be identified as a result of the proposed development.

Whilst Sagentia Aviation understands the DoD's position, it is not clear how any binding agreement (other than to engage) can be placed on the Applicant as no tangible impacts have been identified as currently there is no DoD radar system in place.

3.8.4 Applicant Response to the AirNav Ireland Submission (see Section 3.6)

3.8.4.1 Applicant Response

"The applicant notes the submission by AirNav, that the windfarm falls within the Shannon Airport Runway 06 Instrument Landing System coverage area and notes that ANI Navaids Division requires assessments of the windfarm effects on the following:

1. Windfarm effects on ILS 06 guidance signals

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2. Windfarm effects on ILS 06 flight calibration

The aviation review statement contained in Appendix 16.1 provides an assessment of these elements requested by AirNav Ireland."

3.8.4.2 Sagentia Aviation Summary

Within their Submission {Ref.7} AirNavs clearly sets out the requirement for the Applicant to assess the wind farm effects on both the ILS 06 guidance signals and the wind farm effects on the flight calibration activities. Additionally, AirNav go on to assert that FCSL are approved and capable of conducted both assessments.

In their Response to Submissions {Ref.9}, the Applicant claims that the Aviation Review Statement - Appendix 16.1 of the EIAR {Ref.4}, provides an assessment of these elements requested by AirNav Ireland.

Within the Aviation Review Statement Shannon Airport's ILS has been considered in terms of:

- BRAs {Ref.4 Section 2.3} (Section 3.3.2.4 of this document)
- CNS {Ref.4 Section 2.7} (Section 3.3.2.8 of this document)
- Flight Inspection and Calibration {Ref.4 Section 2.13} (Section 3.3.2.12of this document)

BRAs - The BRAs assessment approach and conclusions are reasonable and proportional in the context of 'screening' to check if a proposed development breaks the invisible 3D protection surfaces defined for nearby CNS equipment. However, BRA assessments are only one element of technical assessments to be considered when safeguarding CNS systems. BRAs assessments are not specialized technical studies of impacts to a systems coverage (computer modelling as requested by Shannon Airport, see Section 1.1).

Whilst Sagentia Aviation agrees that Cloonkett wind farm does not infringe the BRA defined for an ILS system, the Airport has requested *"assessments examining the windfarm effects on ILS 06 guidance signals should include windfarm structures computer modelling and associated signal effects computer simulations, if deemed warranted"*

CNS - The CNS appraisal undertaken by Ai Bridges {Ref.4 Section 2.7} makes a broad conclusion that *"As the proposed wind farm is approximately 14 km from the Localizers and transmitting antennas, it is very unlikely that turbines at the proposed wind farm will have any impact on these ATS communications and radio navigational aids"*

Wind farms even at 14km can present issues to both ILS, VHF communication and navigation systems such as VOR. These impacts can include signal in space interference, signal blocking which could affect RF coverage and carrier interference degradation to the quality of VHF communications. Ai Bridges indicate that impacts are very unlikely due to range, whilst this may be a reasonable assumption for an initial guide to the Applicant, it should be considered as either a qualitative or a quantitative statement.

ILS systems are commissioned to ICAO Annex 10 Volume 1 standards, which includes coverage requirements for the localiser to 46.3km in a sector of 10° each side of the centreline, and out to 31.5km between 10° and 35° each side of the extended centreline. This localiser coverage is also considered in respect to elevation. If an obstruction penetrates this defined coverage both in terms of azimuth coverage and elevation, then impacts to the ILS systems performance could be manifested.

If a Development is assessed to be within the applicable coverage (standard or reduced) then further specialised computer modelling which considers the obstruction as a structure against the actual RF emitting characteristics of the impacted ILS should be undertaken (as alluded to by AirNav at {Ref.7}, FCSL may be an organisation that can undertake ILS modelling studies).

Shannon Airport state in their submission that they believe that the Development lays inside the Localiser coverage pattern; and that further detailed modelling is required (see Section 3.7.1).

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The Applicant has recognised that the Development sits inside the ILS coverage (see Section 3.8.4.1) and agreed in their response to the IAA that they will 'engage' with the authorities to determine impacts to CNS (see Section 3.8.2.1) yet the Applicant then references that the aviation review statement contained in Appendix 16.1{Ref.4} provides an assessment of these elements requested by AirNav Ireland.

{Ref.4} does not contain a detailed technical assessment of whether the development will impact upon the ILS coverage.

Flight Inspection and Calibration -

Within Ref.4 Section 2.13, the Applicant identifies that Cloonkett wind farm appears to be sufficiently distanced from the calibration flight paths based on flight data from 2023 as not to require a change in the standard flight check serials conducted during calibration to maintain Minimum Separation Altitude (MSA) above obstacles.

As Ai Bridges conclude, this should be checked with Flight Calibration Services Ltd (FCSL), the approved Flight Inspection Service Provider for Shannon Airport.

3.8.5 Applicant Response to Shannon Airport's Submission (see Section 3.7)

3.8.5.1 Applicant Response

"The Applicant notes the observation by Shannon Airport Authority. The observation confirms that the proposed development is not within the airport's protection areas and as there is no penetration of the aerodrome obstacle limitation surfaces (OLS), it is unlikely that there will be any Annex 14 OLS impacts due to the wind farm.

Appendix 16.1 of the planning application contains a comprehensive aviation review statement in relation to the proposed development.

The submission by Shannon Airport references that as the proposed turbines are within 45km of Shannon Airport's ARP (Aerodrome Reference Point) and are greater than 100m in height, they would be required to be included in the IAA Electronic Air Navigation Obstacle Dataset.

Section 2.2 of Appendix 16.1 assesses this requirement as raised by Shannon Airport. The aviation review statement confirms that the wind turbines will penetrate the ICAO Annex 15 Aerodrome Surface and therefore, the turbines will need to be registered in the IAA Air Navigation Obstacle Dataset. Figure 5, Appendix 16.1, outlines the obstacles in the vicinity of the proposed development which are already contained in the navigation obstacle dataset. The applicant agrees to engage with the IAA, in the event of a planning consent being granted, that the turbines be included in the IAA Aeronautical Electronic Obstacle Data Sets.

The submission from Shannon Airport references the ANI submission relating to ILS guidance signals and flight calibrations. These areas have been addressed in the response to the AirNav Ireland submission above.

The Applicant notes the reference by Shannon Airport Authority to visual aids for denoting obstacles and should planning be consented, the Applicant agrees to be conditioned to ensure the lighting requirements are 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." The applicant would provide as-constructed coordinates in WGS-84 format together with ground (AOD in meters), and tip height elevations at each wind turbine location.

The Applicant accepts the potential planning condition to notify Shannon Airport Authority, AirNav Ireland and the Authority in advance of commencing crane operations with at least 30 days prior notification of their erection in accordance with S.I. 215 of 2005 IAA (Obstacles to Aircraft in Flight) Order. The Applicant agrees to engage with Shannon Airport Authority and the air navigation service provider AirNav Ireland to confirm that the proposed wind farm development and any associated cranes that would be utilised during its construction would have no impact on Obstacle Limitation Surfaces, Instrument Flight Procedures, Communications, Navigation and Surveillance (CNS) equipment or the safety of flight operations at Shannon Airport."

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3.8.5.2 Sagentia Aviation Summary

In the event of a planning consent being granted, the applicant agrees to engage with the IAA for the wind turbines to be included in the IAA Aeronautical Electronic Obstacle Data Sets.

The submission from Shannon Airport presents requirements for the airport's ILS system to be assessed. Sagentia Aviation's summary of the Applicants response to AirNav's submission at Section 3.8.4.2 applies to the Applicants response to Shannon Airport.

The submission from Shannon Airport presents requirements for the Applicant to implement an approved obstacle lighting scheme and to notify the relevant airport body prior to any crane operations. Sagentia Aviation's summary of the Applicants response to the IAA at Section 3.8.2.2, and to the DoD at Section 3.8.3.2 applies to the Applicants response to Shannon Airport.

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4 Overall Synopsis

4.1 Overview

Sagentia Aviation has reviewed the artifacts provided by the Client as listed in Table 1 regarding the proposed Cloonkett Wind Farm development. Individual review summaries are provided at the respective sections of this document.

4.2 Applicant EIAR Submission Summary

As part of their EIAR submission, the Applicant commissioned Ai Bridges to produce an Aviation Review Statement {Ref.4}. The Aviation review statement considered the following aviation aspects:

- Annex 14 - Obstacle Limitation Surfaces (OLS)
- Annex 15 - Aerodrome Surfaces
- Building Restricted Areas (BRA)
- Minimum Sector Altitudes (MSA)
- Instrument Flight Procedures
- Communication and Navigation Systems
- Shannon PSR
- Shannon SSR
- Woodcock Hill SSR
- Flight Inspection and Calibration
- Aeronautical Obstacle Warning Light Scheme
- Irish Air Corps / DoD Safeguarding
- Garda Air Support Unit and Emergency Aeromedical Service

4.3 Prescribed Bodies (Aviation only) Submission Summary

ACP received submissions from the following prescribed bodies regarding aviation, each of these and their key response points regarding the proposed development of Cloonkett wind farm is bulleted below:

- The Irish Aviation Authority {Ref.5}
  - Prior approval to operate cranes during construction.
  - Agreement to implement an IAA approved obstacle lighting scheme.
  - Provision of development as built WGS-84 format data.
- The Department for Defence {Ref.6}
  - Agreement to implement a DoD approved obstacle lighting scheme.
  - Agreement to engage with the DoD should the development have negative impacts on future military radar systems, and to provide suitable mitigations as soon as practical.
- AirNav Ireland {Ref.7}
  - Assessment of the windfarm effects on ILS 06 guidance signals (which should include windfarm structures computer modelling and associated signal effects computer simulations, if deemed necessary).
  - Assessment of the windfarm effects on ILS 06 flight calibration.

  Note: AirNav state that FCSL are an ANI approved company who possess the expertise required to complete both the signal effects and flight calibration assessments.

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- Shannon Airport {Ref.8}
  - Confirmation that the wind turbines will have no impact on the aerodrome Obstacle Limitation Surfaces (OLS).
  - Full support of AirNav's request for the developer to complete assessments of the windfarm effects on the ILS 06 guidance signals and on ILS 06 flight calibration, including windfarm structures computer modelling and associated signal effects computer simulations, if deemed warranted.

4.4 Applicant's Response to Prescribed Bodies (Aviation only) Summary

The applicant provided a response {Ref.9} to the aviation prescribed bodies submissions, in which they responded to each key point, this is summarised below:

Aviation Item	Prescribed Body Requiring	Applicant Response Summary	Planning Condition Agreed
Prior approval to operate cranes during construction	IAA	The applicant agrees to a condition to notify Shannon Airport Authority, AirNav Ireland and the Authority of intention to commence crane operations with at least 30 days prior notification of their erection in accordance with S.I 215 of 2005 IAA (Obstacles to Aircraft in Flight) Order.	Yes
Agreement to implement an approved obstacle lighting scheme	IAA	The Applicant agrees to a condition of planning to contact the IAA to agree for the implementation of a regulatory approved aeronautical obstacle warning light scheme for the wind farm development.	Yes
	DoD	The Applicant agrees to a condition of planning to engage with the DOD to agree for the implementation of an aeronautical obstacle warning light scheme for the wind farm development, including the illumination and type of lighting to be installed.	Yes
Provision of development as built WGS-84 format data	IAA	The applicant will provide as-constructed coordinates in WGS-84 format together with ground (AOD in meters), and tip height elevations at each wind turbine location.	Yes
Agreement to engage with the DoD should the development have negative impacts on future military radar systems, and to provide suitable mitigations as soon as practical	DoD	In the event of any negative impacts on future military radar systems as a result of the proposed development, the applicant confirms that consultation will be undertaken with the relevant aviation stakeholders, to agree suitable mitigations.	Yes
Assessment of the windfarm effects on ILS	AirNav		Not Stated

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Aviation Item	Prescribed Body Requiring	Applicant Response Summary	Planning Condition Agreed
06 guidance signals (which should include windfarm structures computer modelling and associated signal effects computer simulations, if deemed necessary).	Shannon Airport	*"The aviation review statement contained in Appendix 16.1 provides an assessment of these elements requested by AirNav Ireland."* Windfarm effects on ILS 06 Guidance Signals *"Table 11 of the report confirms that no mitigations are required for communication and navigations systems due to the proposed development, and that there will be no residual impact."* Windfarm effects on ILS 06 Flight Calibration *"the report confirms that it is highly unlikely that there would be any impact on the inspection/calibration test flights"* *"In addition to the assessment provided in Appendix 16.1, the applicant agrees to engage FCSL, to complete an assessment on potential impacts on signals and flight calibration. This assessment will be forwarded to AirNav Ireland for review"*	

Table 3 - Applicant's Response to Prescribed Bodies (Aviation only) Summary

4.5 Final Summary

In the Review Statement {Ref.4} the Applicant has fundamentally provided a 'screening' of key aviation impact areas.

Whilst each of the key pertinent aviation areas have been considered, it would not be appropriate for an Aviation safety holder such as AirNav or Shannon Airport to consider the proposed conclusions in isolation.

Additionally, it should also be noted that whilst Ai Bridges presents a reasonable review of likely IFP impacts, it is Sagentia Aviation's understanding (see Section 3.3.2.6) that Ai Bridges are not an IAA Approved Procedure Design Organisation (APDO) and as such it should be considered that their IFP review should be treated as information only and only as a guide to the Applicant of whether a formal IFP assessment conducted by an IAA APDO is likely to be required.

Both Shannon Airport, AirNav and the DoD provided submissions which with suitable planning conditions, accepted some of the conclusions provided by the Applicant, specifically regarding OLS, Lighting schemes and Crane notification requirements.

However, Shannon Airport and AirNav highlighted that they have identified that the Development sits within the ILS coverage and that specific detailed technical assessments of any impact may be required.

As summarised by Sagentia Aviation at Section 3.8.4.2 an appraisal against the ICAO standard ILS coverage requirements, could establish whether the Development may infringe the RF patterns; if the Development does infringe, then it would be likely that Shannons Airport's stated requirement (see Section 3.7.1) "*The assessments examining the windfarm effects on ILS 06 guidance signals should include windfarm structures computer modelling and associated signal effects computer simulations, if deemed warranted"* would become warranted.

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The Applicant has agreed to *'engage FCSL, to complete an assessment on potential impacts on signals and flight calibration'* which is recognition that further evidence is required before the Aviation authorities can be satisfied.

Sagentia Aviation recognises that neither Shannon Airport or AirNav raised any issues in their submissions regarding PSR or SSR. However, it is difficult to quantify how the Applicant's claim that no mitigation measures are required or no residual impacts exist can be substantiated when complete and verified Detailed Assessment conducted against the EuroControl requirements has not been conducted against the PSR or SSR (see Sagentia Aviation Observations at Section 3.3.2.9 and 3.3.2.10).

4.5.1 Recommendations

- Each of the conditions agreed by the Applicant in Table 3 above should be captured in planning approvals.
- The requirement for the Applicant to commission both a signal (coverage impact) assessment and Flight Calibration assessment should be formalised within the planning approvals.
- Agreement for the Applicant to mitigate the Development should impacts upon Shannon Airport's 06 ILS be identified from the signal (coverage assessment) or Flight Calibration assessment should be formalised within the planning approvals.

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About Sagentia Aviation

Osprey Consulting Services Ltd (t/a Sagentia Aviation) specialises in delivering innovative technical and engineering consultancy services in civil and military aviation environments. It serves government agencies, regulatory authorities, equipment providers, and airport and spaceport operators to enable change and solve critical aviation challenges.

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