



DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

APPENDIX 15

Material Assets

Appendix 15-1 - Telecommunications Impact Study


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Review Statement

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APPENDIX 15.1

Telecommunications Impact Study

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Report


Littleton Wind Farm Telecommunications Impact Study

Document Number:

Author: David McGrath

Approved for Release: Rev 2.0 D McG **Date:** 19/03/2025

Document Filename: *Littleton Wind Farm Telecommunications Impact Study Report*

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Executive Summary

Ai Bridges was commissioned to evaluate the possible impacts that the proposed wind farm development at Littleton, Co. Tipperary could have on the existing telecommunications operator networks. The scope of work included field and desktop surveys to determine telecommunications network infrastructure that could be impacted by the proposed development. Consultations with telecom operators were also undertaken to assist in identifying network infrastructure that could be impacted by the proposed wind farm.

Telecommunications mast-sites with network infrastructure that could potentially be impacted by the development were identified and a field survey of each of these sites was carried out. During the field surveys, radio antennas with bearings in the direction of the wind farm were recorded. The findings of the field surveys are provided in Appendix B of this report.

Consultations with telecom network operators first commenced in 2021. The telecom operators were subsequently contacted in March 2025 and were advised of the most recent site layout. The operators were requested to raise any concerns they may have regarding impacts to their networks due to the proposed development. The responses received (i.e. the 2021 and 2025 responses) from each of the telecom operators are presented in Section 3 of this report.

Using the information obtained from the consultation responses and the field survey assessments, a desktop impact analysis was carried out, and all of the telecommunication operator networks were analysed using radio planning \ modelling software (2D and 3D).

Results from the consultation process indicate that there are fifteen radio links in the vicinity of the proposed development. These radio links are listed below in Table 1. The findings of the network analysis indicate that none of the radio links would be obstructed by the proposed turbine layout.

No.	Operator	Link Description	Nearest Turbine	Fresnel Zone (F1) Clearance Distance to Blade-tip of Turbine	Impact of Proposed Turbine Layout
1	Eir	PTP microwave radio link from Glengoogle to Thurles	T09	> 100 m	No impacts
2	Eir	PTP microwave radio link from Curraheen to Glengoole	T11	65.9 m	No impacts
3	Eir	PTP microwave radio link from Thurles to Kilbrannel	T11	> 100 m	No impacts
4	Eir	PTP microwave radio link from Rosoulty to Glengoole	T09	> 100 m	No impacts
5	Enet	PTP microwave radio link from Ballyspellan to Centenary, Ballyduff	T01	> 1 km	No impacts
6	Enet	PTP microwave radio link from Templemore Garda to Garransilly, Urlingford	T01	> 1 km	No impacts
7	ESB	PTP UHF radio link from Thurles 110kV to Glengoole 38kV	T07	> 500 m	No impacts
8	Three	PTP microwave radio link from Killenaule Quarry (Kilbrannel) to AQS Tipperary	T07	> 100 m	No impacts
9	Three	PTP microwave radio link from Ballyspellan to Leigh	T01	> 100 m	No impacts

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10	Three	PTP microwave radio link from Littleton to Ballyspellan	T03	> 100 m	No impacts
11	Vodafone	PTP microwave radio link from Glengoole to Leigh, Twomileborris	T05	> 100 m	No impacts
12	Vodafone	PTP microwave radio link from Glengoole to Thurles	T09	> 100 m	No impacts
13	Vodafone	PTP microwave radio link from Glengoole to Ballymurreen	T09	> 100 m	No impacts
14	Vodafone	PTP microwave radio link from Glengoole to Laghtseefin, Glencarbry	T11	58.4 m	No impacts
15	Vodafone	PTP microwave radio link from Glengoole to Garranacanty	T11	> 100 m	No impacts

Table 1. Radio links crossing over/near the proposed wind farm site.

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Section 1 - Wind Farm Site Information

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1. Introduction

In this section a brief summary of the wind farm site is provided. Details regarding the site’s geographic location and the proposed wind turbine dimensions are presented.

1.1 Wind Farm Site Information

The proposed wind farm development is located approximately 9 km east of Thurles. The development is in the pre-planning stage and exact details regarding the quantity, location and turbine dimension have yet to be finalized.

For the purpose of this study, an 11-turbine layout has been considered. The coordinates of the turbines assessed in this report are provided in Appendix A. The dimensions of the turbines assessed in this report are provided in Table 2 below.

Wind Farm	Number of Turbines	Turbine Hub Height	Turbine Rotor Diameter
Littleton	11	119 m	162 m

Table 2. Littleton Wind Farm Turbine Details

The location of the proposed wind farm development is shown below in Figure 1.

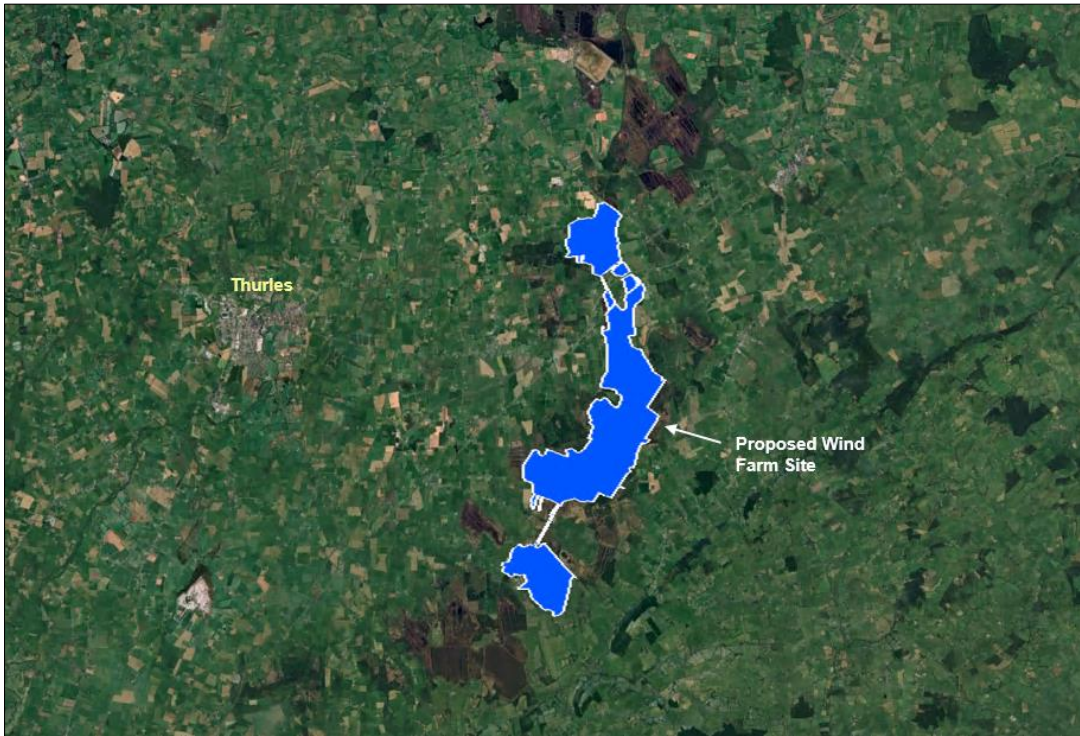




Figure 1. Location of proposed Wind Farm.

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Section 2 - Methodology

	Procedure: 001	Rev: 2.0
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2. Introduction

In this section a brief summary of the Telecommunication Impact Study Methodology is provided.

2.1 Methodology

There are four primary stages in preparing and compiling a communication impact study:

- Telecom Operator Consultations
- Field Surveys
- Desktop Survey Network Modeling and Analysis
- Report Generation

A summary of each of these stages is provided below:

Telecom Operator Consultations

Consultations are commenced with telecom operators who are requested to raise any concerns they have regarding the impact of the proposed wind farm on their networks. The consultation process is used to assist in identifying telecoms infrastructure that could be impacted by the proposed wind farm development.

Field Surveys

Field surveys are undertaken and the co-ordinates of communication masts are recorded. During the field surveys of the communication sites, approximations of antenna size, bearing and height are made for the antennas installed on each of the masts surveyed.

Desktop Survey and Analysis

A desktop survey is carried out to plot the wind turbines in a radio planning tool. The radio planning tool uses GIS and terrain mapping databases to enable accurate modelling. A selection of mast-site coordinates is then obtained and inputs from various operators \ service providers are converted from ITM / IG (Easting and Northing in meters) to degrees minutes seconds format and then imported into the radio planning tool. This provides a means of graphically showing telecommunications sites in the vicinity relative to the proposed wind farm at Littleton. Figure 2 below shows the proposed wind farm site boundary plotted in the radio planning tool.

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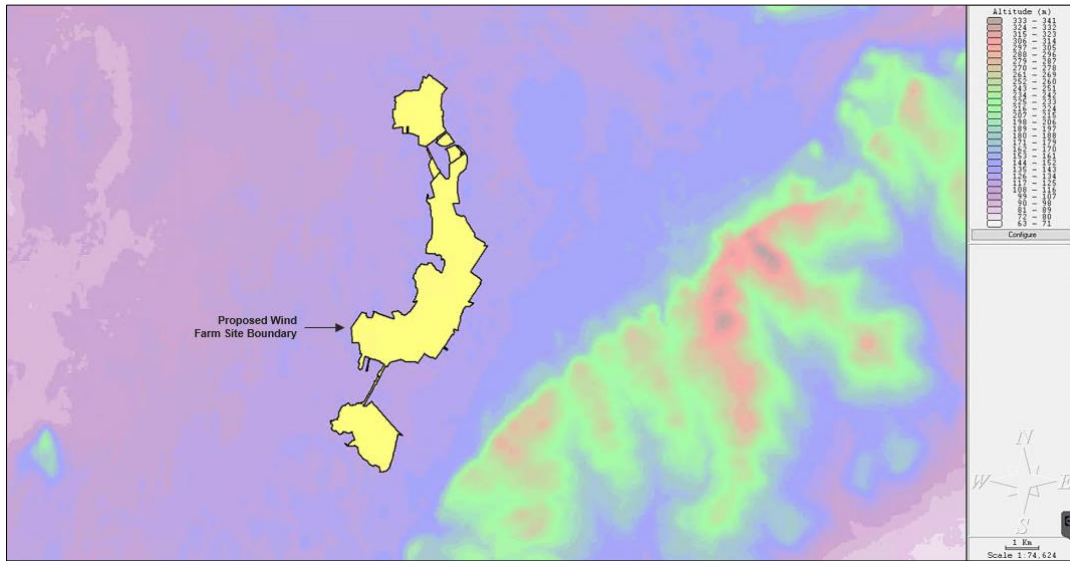


Figure 2. Wind Farm Site plotted in Radio Planning Software

The findings from the consultations and field surveys are collated and the communications networks requiring further analysis are identified. 3D network modeling is used to assess the impact of the turbines on the communications networks.

The results from the network modeling are used to determine if mitigation measures are required. Figure 3 below shows an example of a microwave radio link that crosses over the wind farm site boundary modelled in radio planning software.

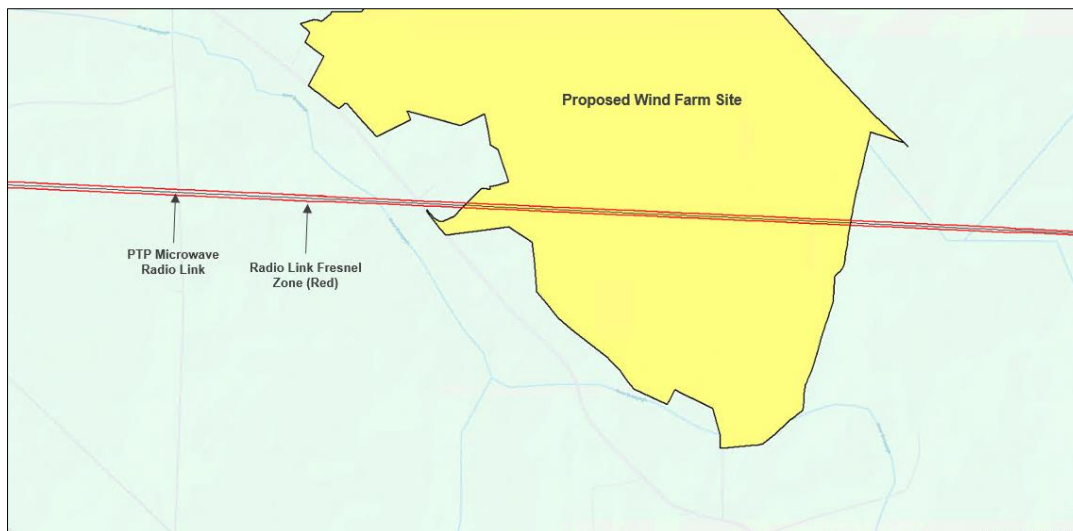




Figure 3. Example of microwave radio link crossing over the proposed wind farm site modelled in radio planning software.

Report Generation

The final stage of the communications impact study process is to collate the data and present the findings & analysis into a report for submission.

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Section 3 - Telecom Operator Consultations

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3. Introduction


In this section the consultation process undertaken with telecom operators is described. The response received from each operator is also provided.

3.1 Telecom Operator Consultations

Consultations with telecom network operators first commenced in July 2021 and subsequent consultations were undertaken in March 2025. The operators were requested to raise any concerns they may have regarding impacts to their networks due to the proposed development. Table 3 lists the telecom operators contacted, and the issues raised by the operators.

The responses received from each of the Telecom Operators are provided in Sections 3.1.1 to 3.1.19 that follow.


ID	Operator	Issues raised by Operator \ Observations.	
		2021	2025
1	2RN	No issues regarding transmission links; however, 2RN did request that a protocol document be signed should the wind farm go ahead (regarding the TV broadcast service in the area).	No issues regarding transmission links; however, 2RN have requested that a protocol document be signed should the wind farm go ahead (regarding the TV broadcast service in the area).
2	Airwave	No response.	No response.
3	An Garda Síochána*	N.A.	No response.
4	Coimisiún na Meán	No issues.	No issues.
5	BT Ireland	No issues.	No issues.
6	CIE/Irish Rail*	N.A.	CIE have stated that the wind farm would be located within the “Coordination Zone” of their GSM-R network (Mobile Network for Railways). The nearest rail line to the proposed development is 9 km away and at this distance there will be no impact to the GSM-R network.
7	Dept. of Defence	No issues.	No response.
8	Eir	Eir raised concerns regarding four PTP radio links.	Eir raised concerns regarding four PTP radio links.
9	Enet	Enet raised concerns regarding six PTP radio links.	Enet raised a concern regarding two Licensed PTP microwave radio links.
10	ESB Networks	ESB raised concerns regarding one PMP radio link.	No response.
11	Imagine Broadband	No issues.	No issues.

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12	IAA / AirNav	No response.	No response.
13	Uisce Éireann*	N.A.	No issues.
14	Tipperary Co Co	No response.	No response.
15	Tetra Ireland (TI)	No issues.	No issues.
16	Three Ireland	Three Ireland raised concerns regarding four PTP radio links.	Three Ireland raised a concern regarding three Licensed PTP microwave radio links.
17	Viatel*	N.A.	No issues.
18	Virgin Media	No issues.	No response.
19	Vodafone	Vodafone raised concerns regarding five PTP radio links.	No response.

Table 3. Telecom Operators Consulted

**Telecom Operator not contacted in original (2021) round of consultations.*

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3.1.1 2RN Response to Consultations

2RN did not raise any concerns in relation to transmission links; however, 2RN did have a concern regarding their broadcast service in the area and have requested that a protocol document be signed should the wind farm go ahead. The responses received from 2RN are provided below.

2021 Response:

“The proposed turbine locations will not affect our fixed linking. There is a risk of interference to DTT viewers receiving from our sites at Kilduff and to a lesser extent from Mt. Leinster. We would therefore ask that a Protocol be signed between the Developer and 2rn should the site go ahead.”

2025 Response:

“There has been no change to our network in the area outlined in your email. 2rn’s fixed linking will not be affected, there is a risk to broadcast services from Kilduff and to a lesser extent from Mt. Leinster. We would therefore ask that a Protocol be signed between the Developer and 2rn should the site go ahead.”

3.1.2 Airwave Response to Consultations

Airwave provided the following email response to consultations:

2021 Response:

N.A. (Not contacted in 2021)

2025 Response:

No response received.

3.1.3 An Garda Síochána Response to Consultations

An Garda Síochána provided the following email response to consultations:

2021 Response:

N.A. (Not contacted in 2021)

2025 Response:

No response received.

3.1.4 Coimisiún na Meán Response to Consultations

Coimisiún na Meán provided the following email response to consultations:

2021 Response:

“The BAI [former name of Coimisiún na Meán] does not perform an in-depth analysis of the effect of wind turbines on FM networks. However, we are not aware of any issues from existing windfarms into existing FM networks. Also, the proposed windfarms are not located close to any existing or planned FM transmission sites.”

2025 Response:

“Coimisiún na Meán does not perform an in-depth analysis of the effect of wind turbines on FM networks. However, we are not aware of any issues from existing windfarms into existing FM networks. Also, the proposed windfarms are not located close to any existing or planned FM transmission sites.”

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3.1.5 BT Ireland Response to Consultations

BT provided the following email response to consultations:

2021 Response:

“BT are in process of winding down our microwave network which will be complete in the coming months. We only have a network presence in Louth and Waterford.”

2025 Response:

“BT no longer have a radio microwave network.”

3.1.6 CIE/Irish Rail Response to Consultations

CIE provided the following email response to consultations:

2021 Response:

N.A. (Not contacted in 2021)

2025 Response:

“The proposed site lies within the GSM-R (Mobile Network for Railways) coordination zone. Please see below:

From a study carried out by the ANFR (Agence Nationale des Frequences in France), the output calls for 2 main recommendations by defining 2 main zones as follows:

- 1- Exclusion zone: wind farm not less than 5 Km from antenna*
- 2- Coordination zone: : 5Km<wind farm <30Km: this area, coordination between operators is required to fix any issue and impact on the signal propagation.”*

3.1.7 Department of Defence (DoD) Response to Consultations

The DoD provided the following email response to consultations:

2021 Response:

“I refer to your e-mail below, in relation to the proposed Windfarm development of Littleton Wind Farm in Co Tipperary.

As a matter of practice, the Department of Defence does not provide any observations or advice in the Pre- planning process, except where the relevant parties have been directed by a planning authority to seek the Department’s views.

The Minister for Defence reserves the right to comment on an actual planning application as and when it is submitted in accordance with the provisions of the planning regulatory code.”

2025 Response:


No response received.

3.1.8 Eir Response to Consultations

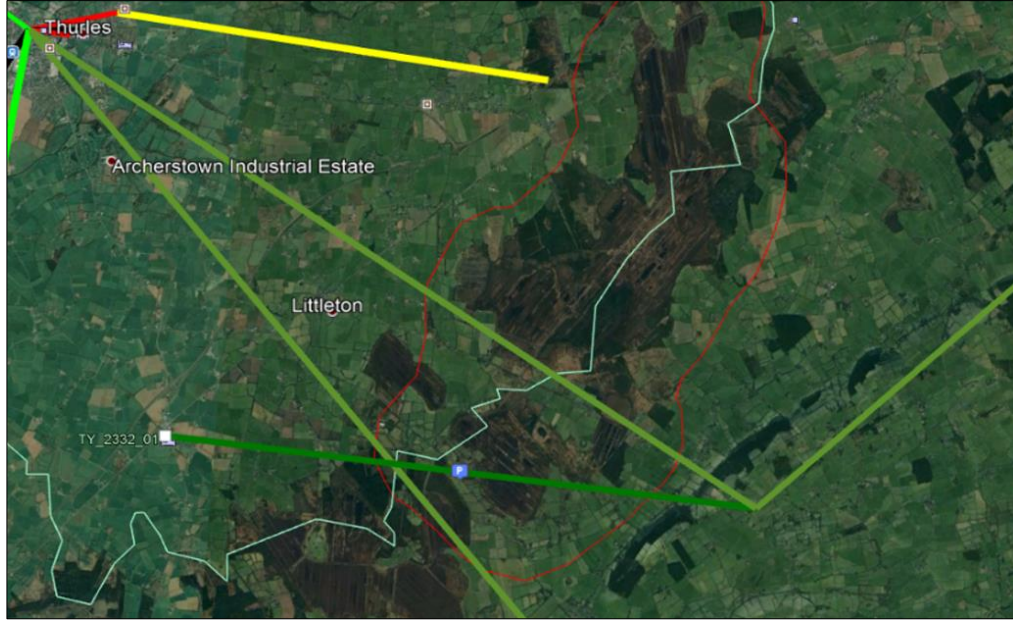
Eir provided the following email responses to consultations:

2021 Response

“We have [four] links within the proposed area that are at risk with the current plots, the end points of the transmission link are below, for windfarm developments we would keep a buffer of 100meters radius away from this transmission path.”

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Link Name / ID	Band MHz/GHz	Link Length	Site A				Site B							
			Lat	Long	Easting	Northing	Ant Height	Structure Height	Lat	Long	Easting	Northing	Ant Height	Structure Height
TY_4700-TY_2484	11Ghz	15km	52°36'33.24"N	7°37'26.22"W			30m		52°40'48.03"N	7°49'4.87"W			22m	
TY_2332-TY_4700	13Ghz	10km	52°36'52.47"N	7°46'32.08"W			14m		52°36'33.24"N	7°37'26.22"W			31m	
TY_2484-TY_1918	11Ghz	15km	52°40'48.03"N	7°49'4.87"W			25m		52°34'54.49"N	7°40'15.46"W			27m	
RSY-GCL	13Ghz	25km	52°41'1.02"N	7°58'17.04"W			10m		52°36'33.72"N	7°37'25.43"W			30m	



2025 Response

"There is no change with the status of our links over the site."

3.1.9 Enet Response to Consultations

Enet provided the following email responses to consultations:

2021 Response

"See links passing through this area."

Link Name / ID	Band MHz/GHz	Link Length	Site A				Site B							
			Lat	Long	Easting	Northing	Ant Height	Structure Height	Lat	Long	Easting	Northing	Ant Height	Structure Height
Scoil Ruain	11Ghz	33.3km	52°50'6.77"N	7°54'35.98"W			15m	36m	52°34'17.30"N	7°40'37.40"W			6m	
St Josephs College	11Ghz	31.3km	52°38'40.91"N	7°31'47.47"W			15m	36m	52°44'55.95"N	7°57'36.25"W			6m	
Hivolt Tipperary	15Ghz	13.84km	52°38'40.91"N	7°31'47.47"W			15m	36m	52°42'7.18"N	7°43'13.53"W			6m	
Centenary Ballyduff	15Ghz	14.3km	52°38'40.91"N	7°31'47.47"W			15m	36m	52°41'54.66"N	7°42'54.16"W			7m	
Templemore Garda	8Ghz	26.5km	52°38'40.91"N	7°31'47.47"W			15m	36m	52°47'24.95"N	7°50'25.24"W			15m	30m
Esb Kilduff	7Ghz	33.3km	52°38'40.91"N	7°31'47.47"W			15m	36m	52°50'6.45"N	7°54'38.30"W			15m	30m

2025 Response

"We now have just two links affected currently:"

Link Name / ID	Band MHz/GHz	Link Length	Site A				Site B				
			Lat	Long	Ant Height	Structure Height	Lat	Long	Ant Height	Structure Height	
TC Ballyspellan - Centenary Ballyduff	13Ghz	15.6km	52.760144	-7.508189	15m	42m	52.698563	-7.715087	7m		
Templemore Garda – Signal Urlingford	8Ghz	26.5km	52.790264	-7.840344	15m	36m	52.644696	-7.529853	15m	36m	

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3.1.10 ESB Response to Consultations

ESB provided the following email responses to consultations:

2021 Response

“Please see the below details. There is one link crossing the outline planned windfarm. Please let me know when the details and locations of the turbines have been identified.”

Link Name / ID	Band MHz\GHz	Link Length	Site A						Site B					
			Lat	Long	Easting	Northing	Ant Height	Structure Height	Lat	Long	Easting	Northing	Ant Height	Structure Height
Thurles 110kV to Glengoose 38kV P2MP	458MHz	13.35km	52.691998	-7.7646142	215963	160090	14	14	52.616569	-7.6431035	224219	151730	15	15

2025 Response

No response received.

3.1.11 Imagine Broadband Response to Consultations

Imagine Broadband provided the following email response to consultations:

2021 Response

“No imagine MW links are affected by this development.”

2025 Response

“No change. Imagine are not affected by this development.”

3.1.12 AirNav Ireland Response to Consultations

AirNav provided the following email response to consultations:

2021 Response

No response received.

2025 Response

No response received.

3.1.13 Uisce Éireann Response to Consultations


Uisce Éireann provided the following email response to consultations:

2021 Response

N.A. (Not contacted in 2021).

2025 Response

“I can confirm that Uisce Éireann have no communications links traversing the proposed development”.

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3.1.14 Tipperary County Council Response to Consultations

Tipperary County Council provided the following email response to consultations:

2021 Response

No response received.

2025 Response

No response received.

3.1.15 Tetra Ireland Response to Consultations

Tetra Ireland provided the following email response to consultations:

2021 Response

"We anticipate no impact from the development as proposed. Can you ensure the proposal is also reviewed by eir."

2025 Response

"We anticipate no impact from the development as proposed. Can you ensure the development is also reviewed by eir please."

3.1.16 Three Ireland Response to Consultations

Three Ireland provided the following email response to consultations:

2021 Response

"I have reviewed the area for the proposed Littleton WF and 3Ireland have 4 microwave links that traverse the area and could potentially be affected. Please find attached details as requested and Google earth view of the links."

Link no.	Link Ref	Freq.	Length	Site A	X	Y	Dish Height	Site B	X	Y	Dish Height
1	ML051227	13GHz	21km	TP0134	220322	151371	20m	KK0120	233191	167793	18m
2	ML020634	18GHz	14.3km	TP0215	222354	147841	25m	TP0002	212791	158375	26m
3	ML051109	13GHz	27.8km	KK0120	233191	167793	30m	TP0119	211502	150398	30m
4	ML050205	15GHz	15km	KK0120	233191	167793	25m	TP0079	221364	158480	26m



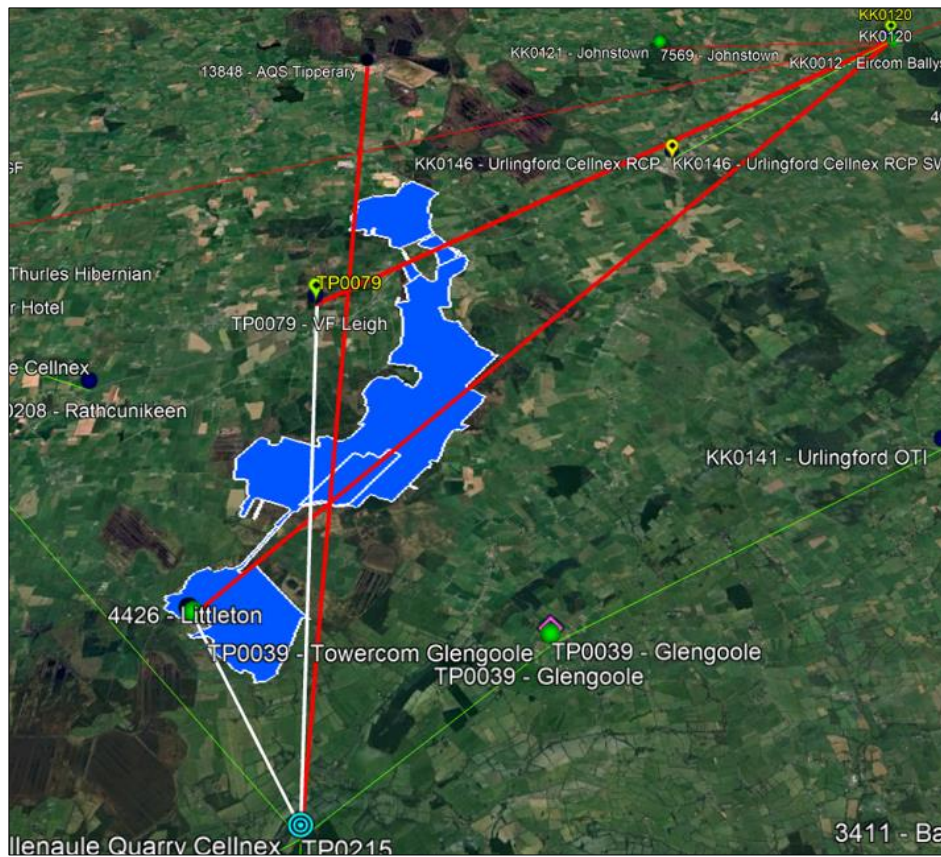
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2025 Response

"We have 3 x live links going through that area (red lines).

Link no.	Link Ref	Freq.	Length	Site A	X	Y	Dish Height (m)	Site B	X	Y	Dish Height (m)
1	ML090503	13GHz	18,7km	TP0215 - Killenaule Quarry Cellnex	222,354	147,841	23	13848 - AQS Tipperary	221,584	166,603	13
2	ML050205	15GHz	15km	KK0120 - Ballyspellan	233,191	167,793	6	TP0079 - VF Leigh	221,364	158,480	25,5
3	ML051227	13GHz	20,8km	TP0134 - Littleton	220,322	151,371	20	KK0120 - Ballyspellan	233,191	167,793	18

We were planning to re-route TP0079 to TP0215 Killenaule quarry (white line) - for Roll-out 2025. There is also an option to re-route Littleton to TP0215 Killenaule quarry. Looks like both of these options would be impacted by that area."



3.1.17 Viatel Response to Consultations


Viatel provided the following email response to consultations:

2021 Response

N.A. (Not contacted in 2021).

2025 Response

"No impact on Viatel wireless infrastructure."

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3.1.18 Virgin Media Response to Consultations

Virgin Media provided the following email response to consultations:

2021 Response

“This will have no impact on VM services in the area.”

2025 Response

No response received.

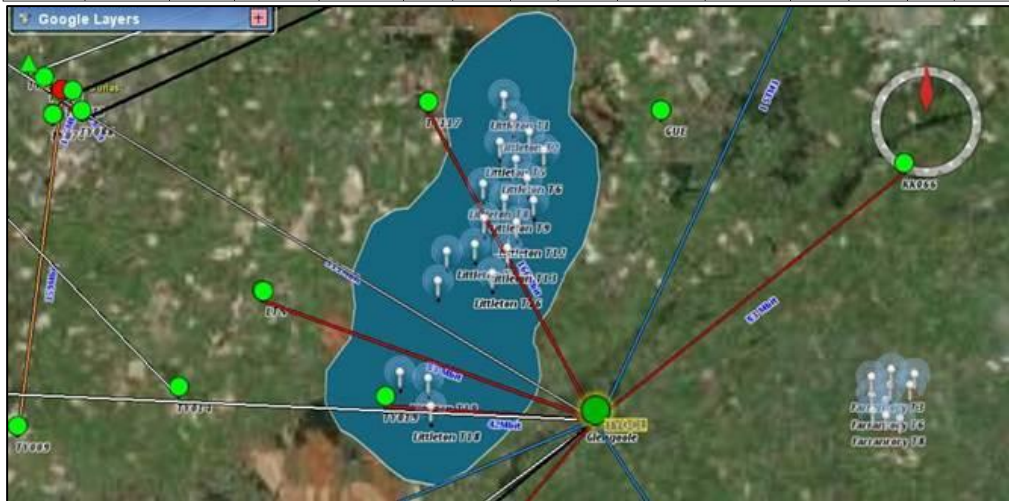
3.1.19 Vodafone Ireland Response to Consultations

Vodafone provided the following email response to consultations:

2021 Response

“Please see below.”


Link Name / ID	Band MHz/GHz	Link Length	Site A						Site B					
			Lat	Long	Easting	Northing	Ant Height	Structure Height	Lat	Long	Easting	Northing	Ant Height	Structure Height
TYGCLTY117	26GHz	8.6	052-36-34.00	007-37-26.30	225523	150932	20	43	052-40-38.49	007-41-04.20	221389.6	158470.1	20	34
TYGCLTYTH9	18GHz	15.31	052-36-34.00	007-37-26.30	225523	150932	25	43	052-40-48.07	007-49-04.96	212356	158735	15	23
TYGCLTY051	26GHz	8.66	052-36-34.00	007-37-26.30	225523	150932	15	43	052-38-07.86	007-44-39.98	217951.8	153797.6	15	13
TYGCLTY019	26GHz	5.16	052-36-34.00	007-37-26.30	225523	150932	30	43	052-36-44.43	007-42-00.11	220369.3	151230.3	15	15
TYGCLTYLSF	19GHz	31.69	052-36-34.00	007-37-26.30	225523	150932	15	43	052-37-16.86	008-05-29.07	193858.7	152194.3	15	36
TYGCLTY004	11GHz	37.83	052-36-34.00	007-37-26.30	225523	150932	30	43	052-28-36.60	008-08-14.38	190718.4	136117.3	24	24



“Link TYGCLTY019 can be disregarded , as it is to be decommissioned.”

2025 Response

No response received.

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Section 4 - Field Surveys

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4. Introduction

To assess the accuracy of the network information (radio link co-ordinates, antenna heights etc.) provided by the telecom operators, field surveys of the telecom-mast sites in the vicinity of the proposed wind farm were carried out. During the field surveys, radio antennas with bearings in the direction of the wind farm were recorded.

The telecom mast-sites surveyed for this study (labelled Mast-Site A to Mast-Site P) are shown relative to the proposed wind farm site in Figure 4 below. The findings from the field surveys of the mast-sites are presented in Appendix B of this report.

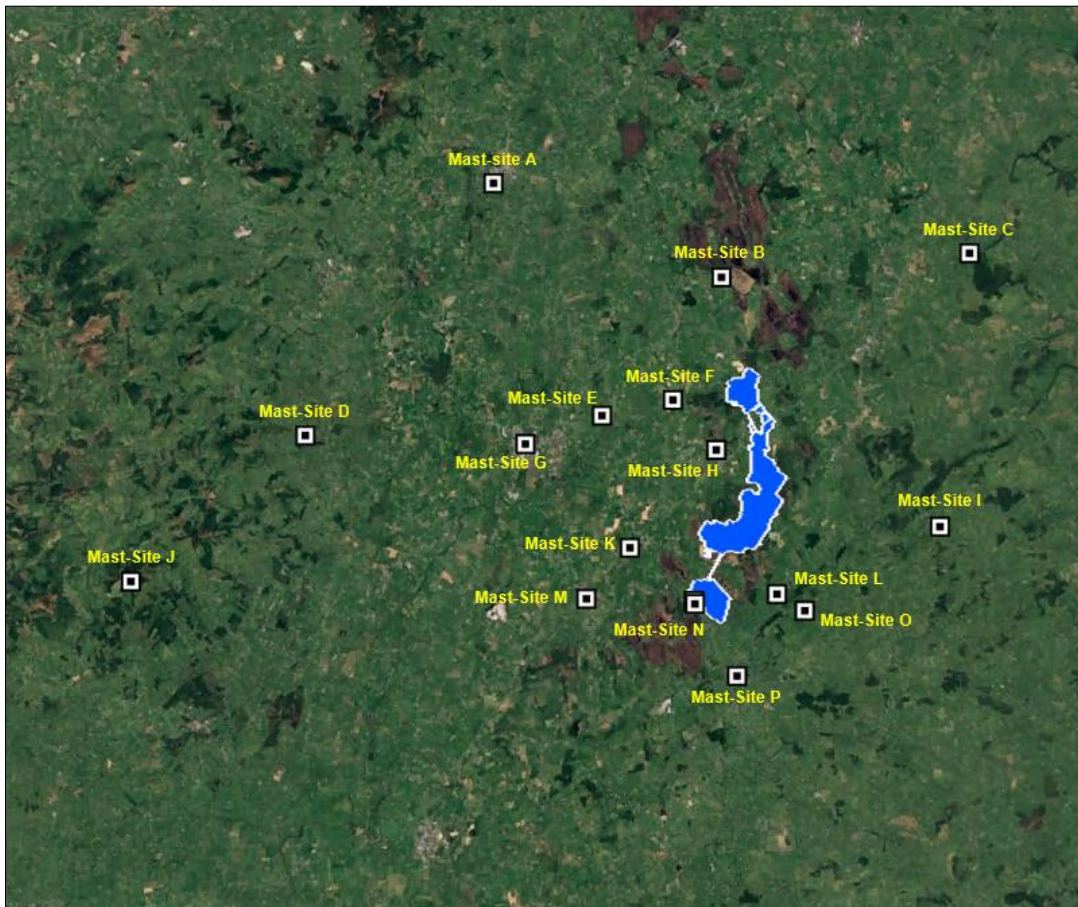




Figure 4. Telecom Mast-Sites in the vicinity of Littleton Wind Farm.

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Section 5 - Desktop Survey Analysis

	Procedure: 001	Rev: 2.0
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5. Introduction

Based on the findings of the consultation process, there are five Telecom Operators with a network in the vicinity of the proposed development that requires a detailed technical analysis:

- Eir Network
- Enet Network
- ESB Network
- Three Ireland Network
- Vodafone Network

Sections 5.1 to 5.5 below outline the desktop survey analysis findings* for the Telecom Operator Networks listed above.

5.1 Eir Network Analysis

The Eir Network in the vicinity of the proposed wind farm consists of four Point-to-Point (PTP) microwave radio links. The radio links are listed below in Table 4 and a Plan View of the Eir radio network is shown in Figure 5.

No.	Operator	Description
1	Eir	PTP microwave radio link from Glengoogle to Thurles
2	Eir	PTP microwave radio link from Curraheen to Glengoogle
3	Eir	PTP microwave radio link from Thurles to Kilbrannel
4	Eir	PTP microwave radio link from Rosoulty to Glengoogle

Table 4. Eir Radio Links requiring Analysis

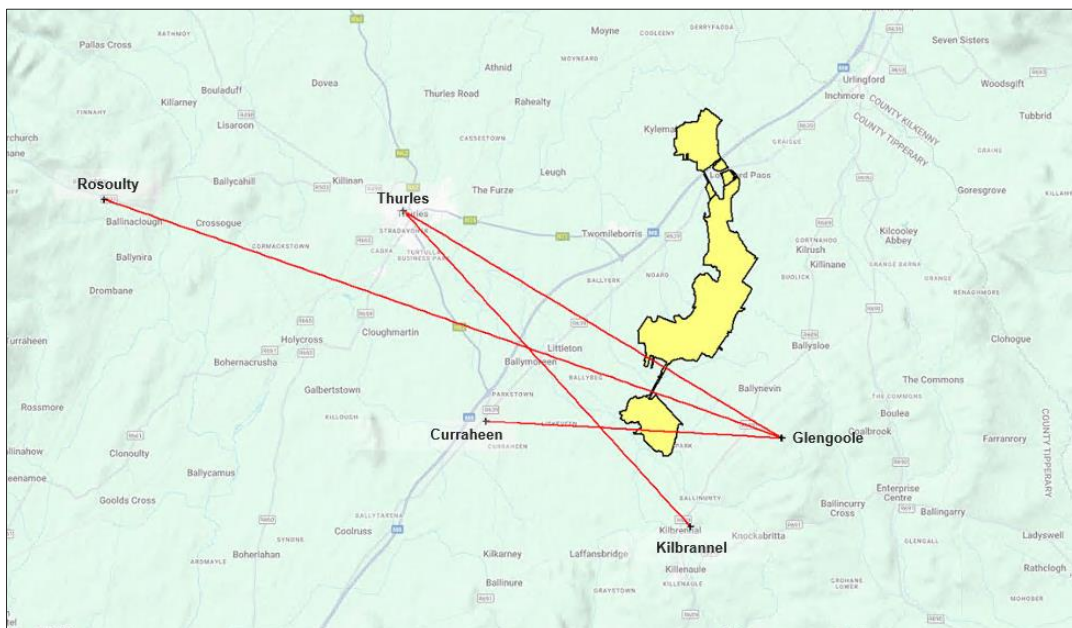


Figure 5. Plan View of the Eir Radio Network


* The Desktop Survey Analysis findings are subject to accuracy of the information (GPS co-ordinates, turbine dimensions, etc.) provided to Ai Bridges.

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Table 5 below provides a brief summary of the network analysis for the Eir network in the vicinity of the proposed wind farm.

Radio Link ID	Link Description	Nearest Turbine	Fresnel Zone (F1) Clearance	Wind Farm Impacts / Observations
Eir_L1	Glengoogle to Thurles	T09	> 100 m	No impacts.
Eir_L2	Curraheen to Glengoole	T11	65.9 m	No impacts.
Eir_L3	Thurles to Kilbrannel	T11	> 100 m	No impacts.
Eir_L4	Rosoulty to Glengoole	T09	> 100 m	No impacts.

Table 5. Eir Network – Analysis Summary

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5.2 Enet Network Analysis

The Enet Network in the vicinity of Littleton consists of two Point-to-Point (PTP) microwave radio links. The radio links are listed below in Table 6 and a Plan View of the Enet radio network is shown in Figure 8.

No.	Operator	Description
1	Enet	PTP microwave radio link from Ballyspellan to Centenary, Ballyduff
2	Enet	PTP microwave radio link from Templemore Garda to Garransilly, Uringford

Table 6. Enet Radio Links requiring Analysis

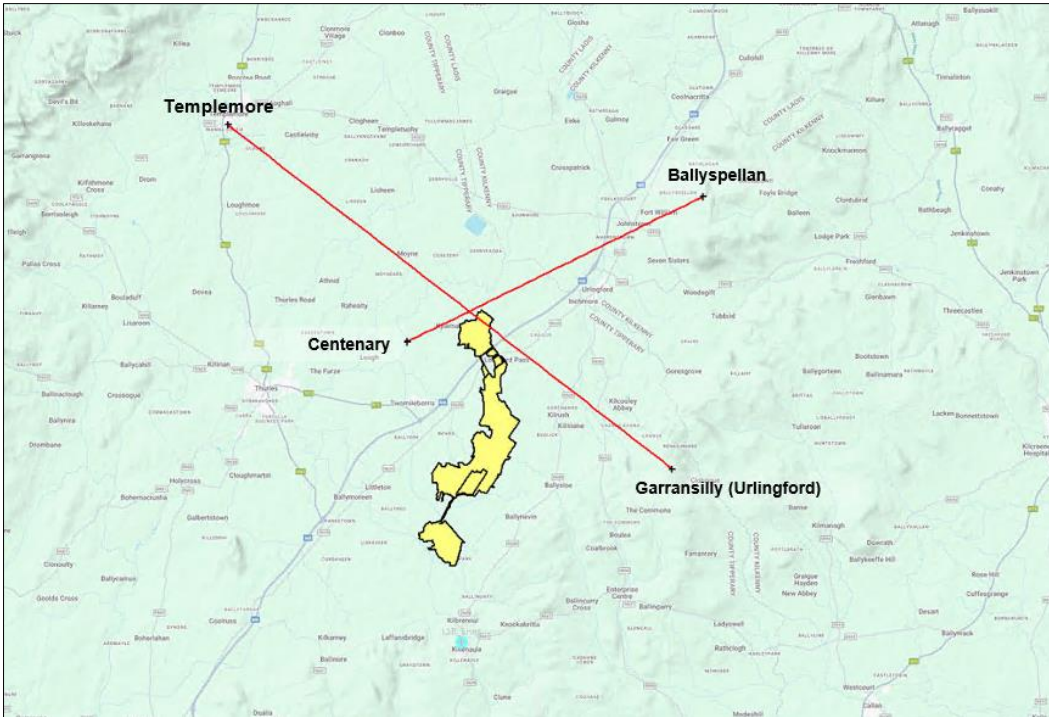



Figure 8. Plan View of the Enet Radio Network

Figure 9 below shows a Close-up Plan View of the Enet microwave radio links relative to the proposed wind turbines. The plan view indicates that none of the proposed turbines would obstruct the radio links and the operation of the Enet network would not be impacted by the proposed development.

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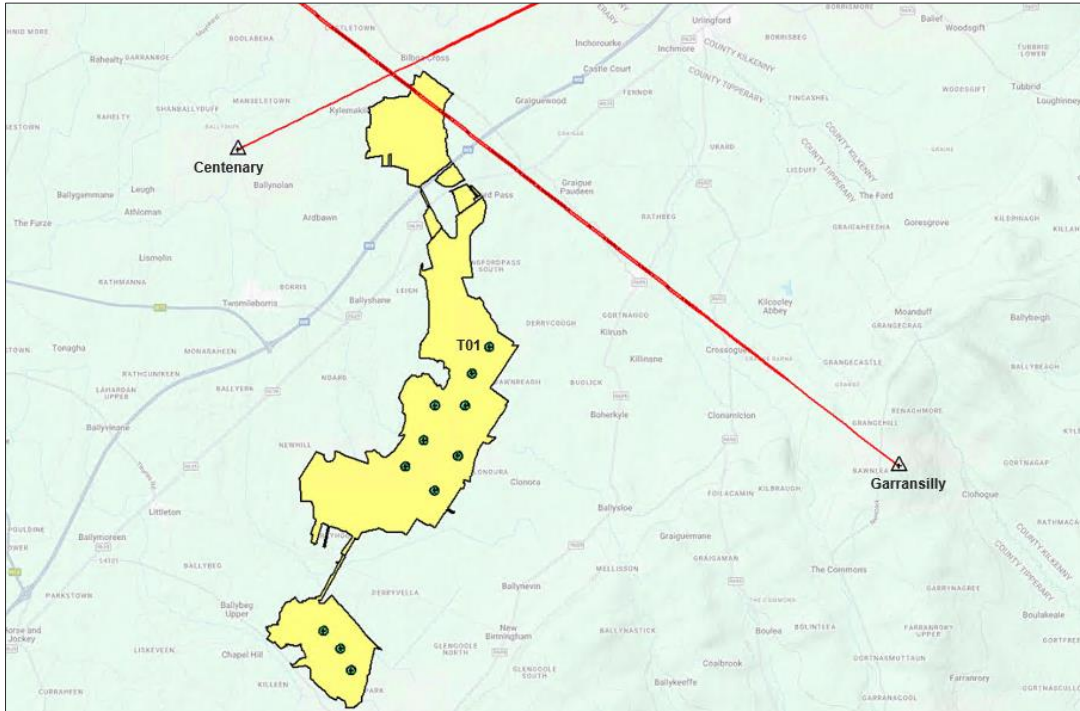



Figure 9. Enet Network – Close-up Plan View.

Table 7 below provides a brief summary of the network analysis for the Enet network in the vicinity of the proposed wind farm.

Radio Link ID	Link Description	Nearest Turbine	Fresnel Zone (F1) Clearance	Wind Farm Impacts / Observations
Enet_L1	Ballyspellan to Centenary, Ballyduff	T01	> 1 km	No impacts.
Enet_L2	Templemore Garda to Garransilly, Urlingford	T01	> 1 km	No impacts.

Table 7. Enet Network – Analysis Summary

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5.3 ESB Services Network Analysis

The ESB Network in the vicinity of Littleton consists of one Point-to-Multipoint (PMP) UHF radio link. The radio link is listed below in Table 8 and a Plan View of the ESB radio network is shown in Figure 10.

No.	Operator	Description
1	ESB	PTP UHF radio link from Thurles 110kV to Glengoose 38kV

Table 8. ESB Radio Links requiring Analysis

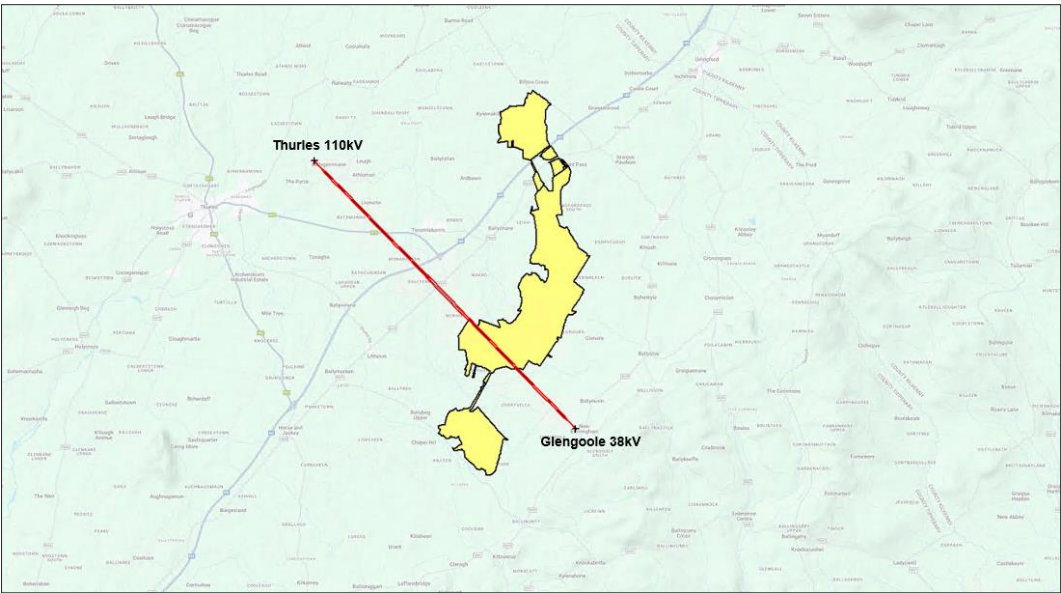


Figure 10. Plan View of the ESB Radio Network

Figure 11 below shows a Close-up Plan View of the ESB radio link relative to the proposed wind turbines. The plan view indicates that none of the proposed turbines would obstruct the radio link and the operation of the ESB network would not be impacted by the proposed development.

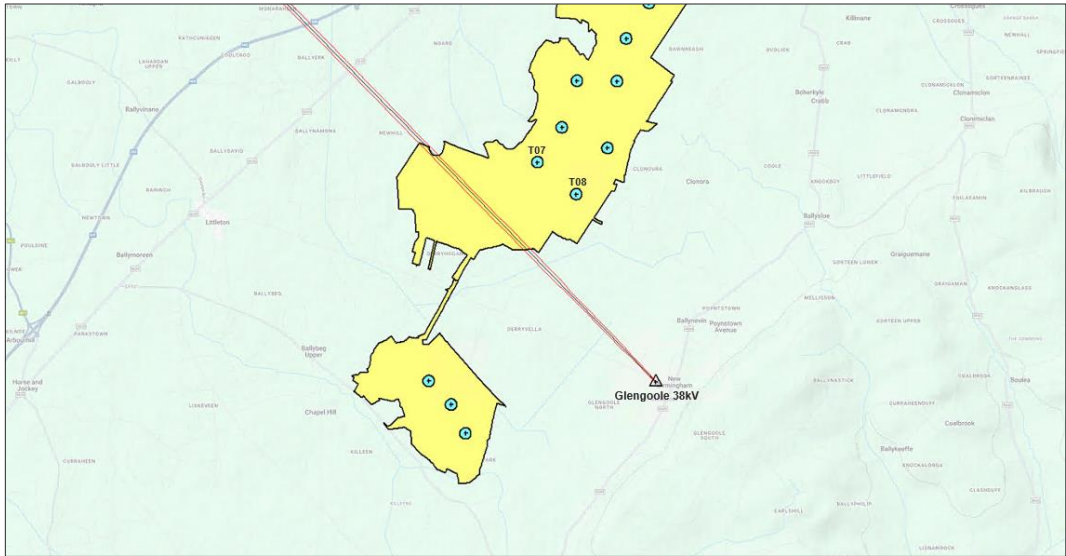


Figure 11. ESB Network – Close-up Plan View.

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Table 9 below provides a brief summary of the network analysis for the ESB network in the vicinity of the proposed wind farm.

Radio Link ID	Link Description	Nearest Turbine	Fresnel Zone (F1) Clearance	Wind Farm Impacts / Observations
ESB_L1	Thurles 110kV to Glengoole 38kV	T07	> 500 m	No impacts.

Table 9. ESB Network – Analysis Summary

	Procedure: 001	Rev: 2.0
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5.4 Three Ireland Network Analysis

The Three Ireland Network in the vicinity of Littleton consists of three Point-to-Point (PTP) microwave radio links. The radio links are listed below in Table 10 and a Plan View of the Three Ireland radio network is shown in Figure 12.

No.	Operator	Description
1	Three	PTP microwave radio link from Killenaule Quarry (Kilbrannel) to AQS Tipperary
2	Three	PTP microwave radio link from Ballyspellan to Leigh
3	Three	PTP microwave radio link from Littleton to Ballyspellan

Table 10. Three Radio Links requiring Analysis

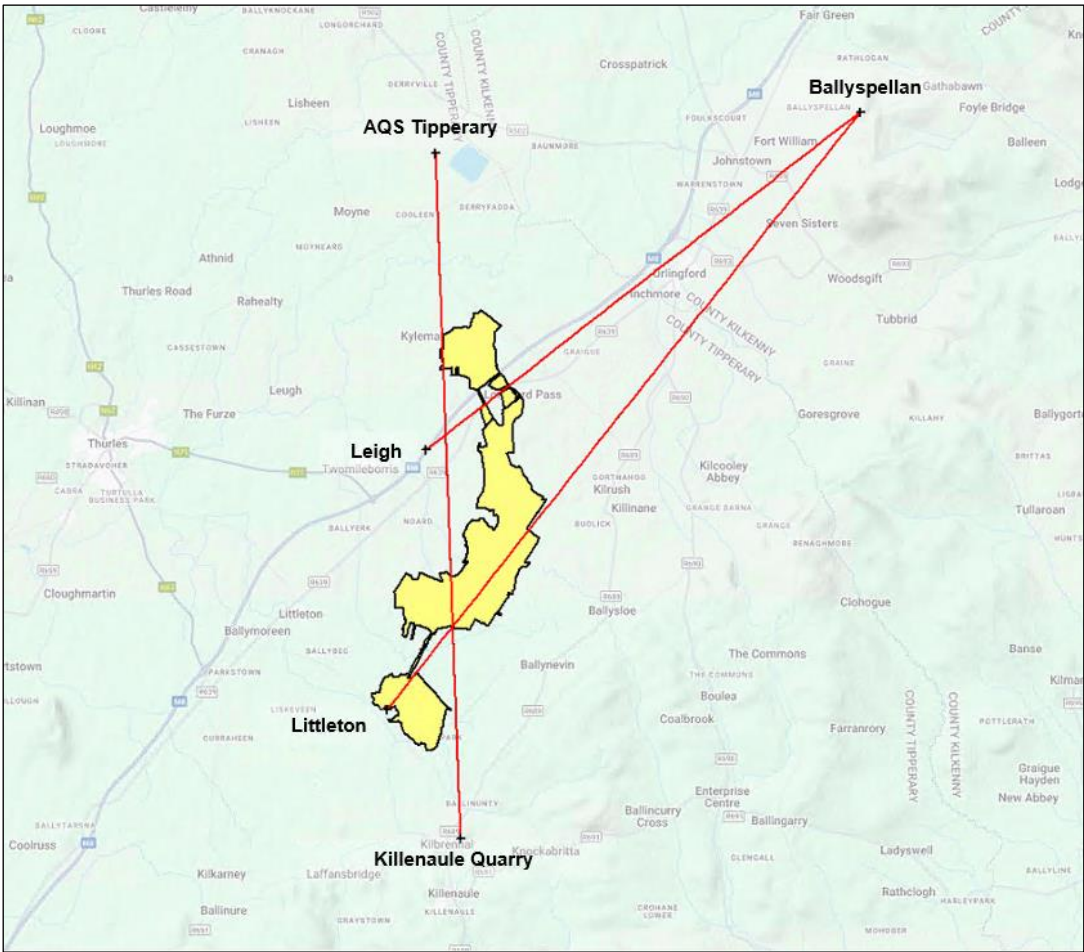


Figure 12. Plan View of the Three Ireland Radio Network

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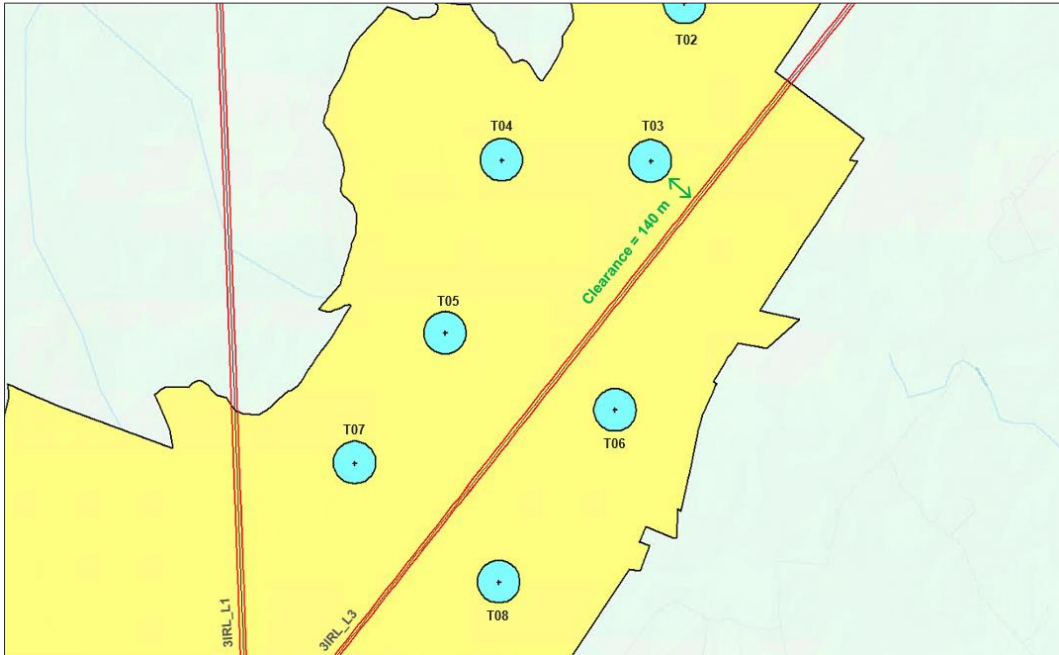



Figure 13. Three Ireland Network – Close-up Plan View.

Table 11 below provides a brief summary of the network analysis for the Three Ireland network in the vicinity of the proposed wind farm.

Radio Link ID	Link Description	Nearest Turbine	Fresnel Zone (F1) Clearance	Wind Farm Impacts / Observations
3IRL_L1	Killenaule Quarry to AQS Tipperary	T07	> 100 m	No impacts.
3IRL_L2	Ballyspellan to Leigh	T01	> 100 m	No impacts.
3IRL_L3	Littleton to Ballyspellan	T03	> 100 m	No impacts.

Table 11. Three Ireland Network – Analysis Summary

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5.5 Vodafone Ireland Network Analysis

The Vodafone Ireland Network in the vicinity of the proposed Littleton wind farm consists of five Point-to-Point (PTP) microwave radio links. The radio links are listed below in Table 12 and a Plan View of the Vodafone radio network is shown in Figure 14.

No.	Operator	Description
1	Vodafone	PTP microwave radio link from Glengoole to Leigh, Twomileborris
2	Vodafone	PTP microwave radio link from Glengoole to Thurles
3	Vodafone	PTP microwave radio link from Glengoole to Ballymurreen
4	Vodafone	PTP microwave radio link from Glengoole to Laghtseeffin, Glencarbry
5	Vodafone	PTP microwave radio link from Glengoole to Garranacanty

Table 12. Vodafone Ireland Radio Links requiring Analysis

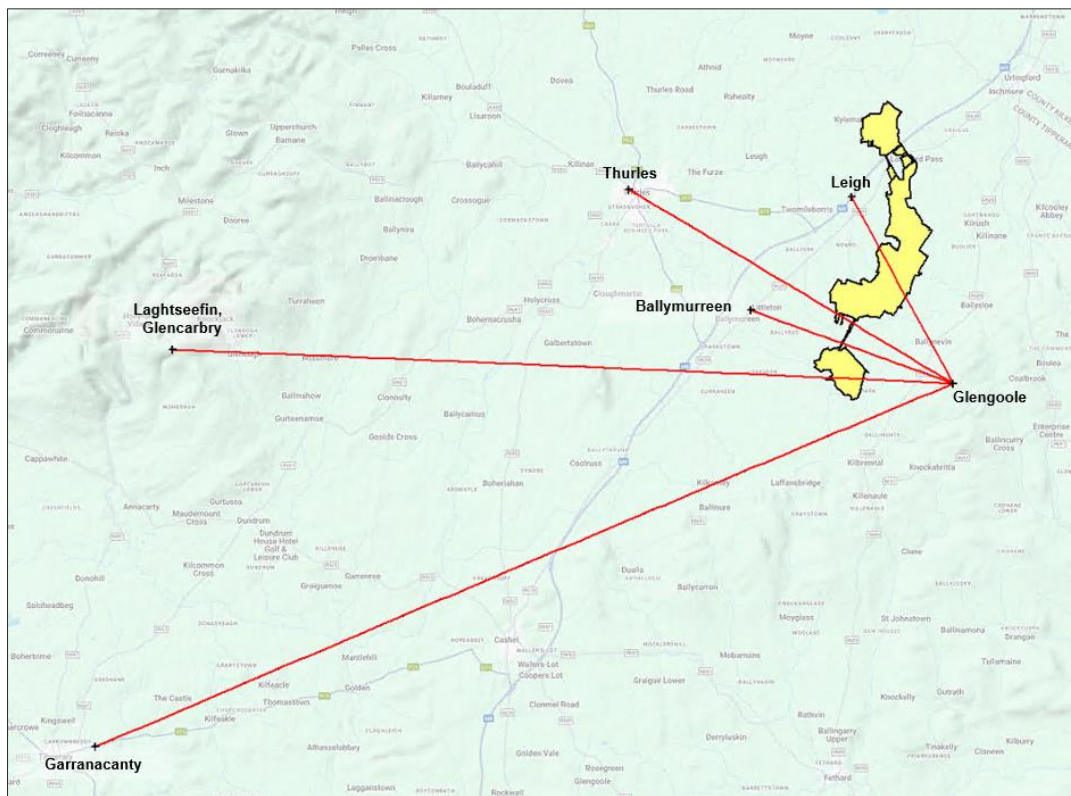



Figure 14. Plan View of the Vodafone Ireland Radio Network

Figure 15 below shows a Close-up Plan View of the Vodafone microwave radio links relative to the proposed wind turbines. The plan view indicates that Turbine T11 is relatively near to the Vodafone radio link between Glengoole and Laghtseeffin.

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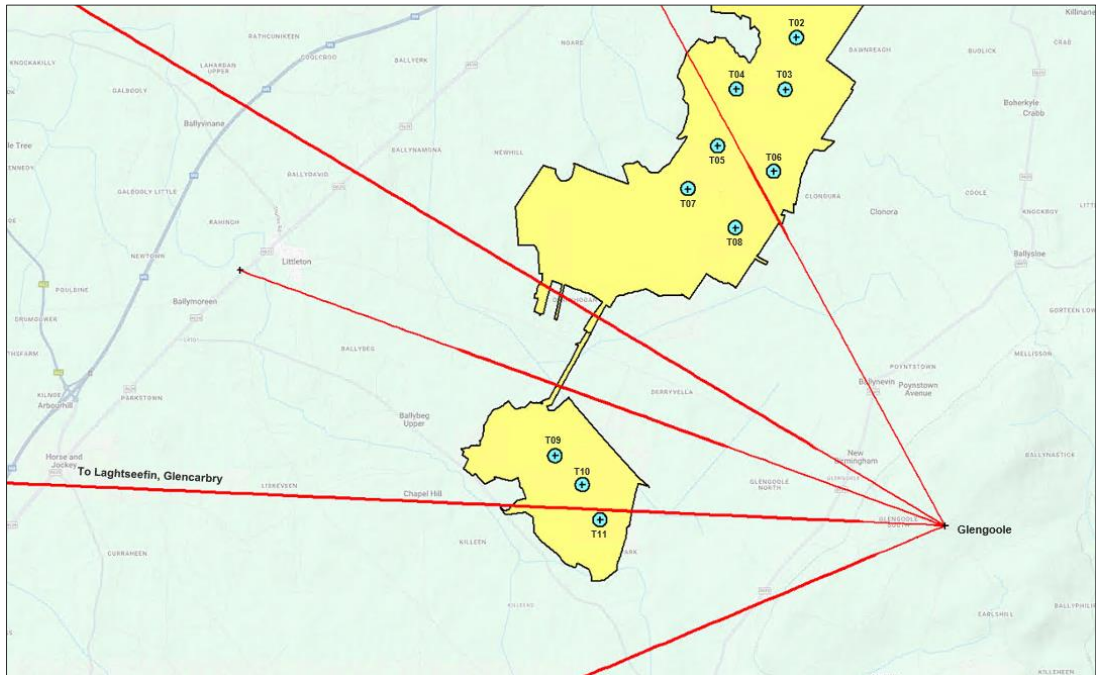


Figure 15. Vodafone Network – Close-up Plan View.

To further assess the potential impact of T11, the radio link has been modelled in 3D and the Clearance Distance between the Fresnel Zone (F1) of the link and the blade-tip of T11 has been calculated. A 3D view of the microwave radio link relative to the proposed turbine is shown below in Figure 16.

The results of the 3D analysis indicate that there is a clearance distance of over 50 m between the blade-tip of T11 and the Fresnel Zone of the radio link. At this distance there would be no impact to the Vodafone radio link.

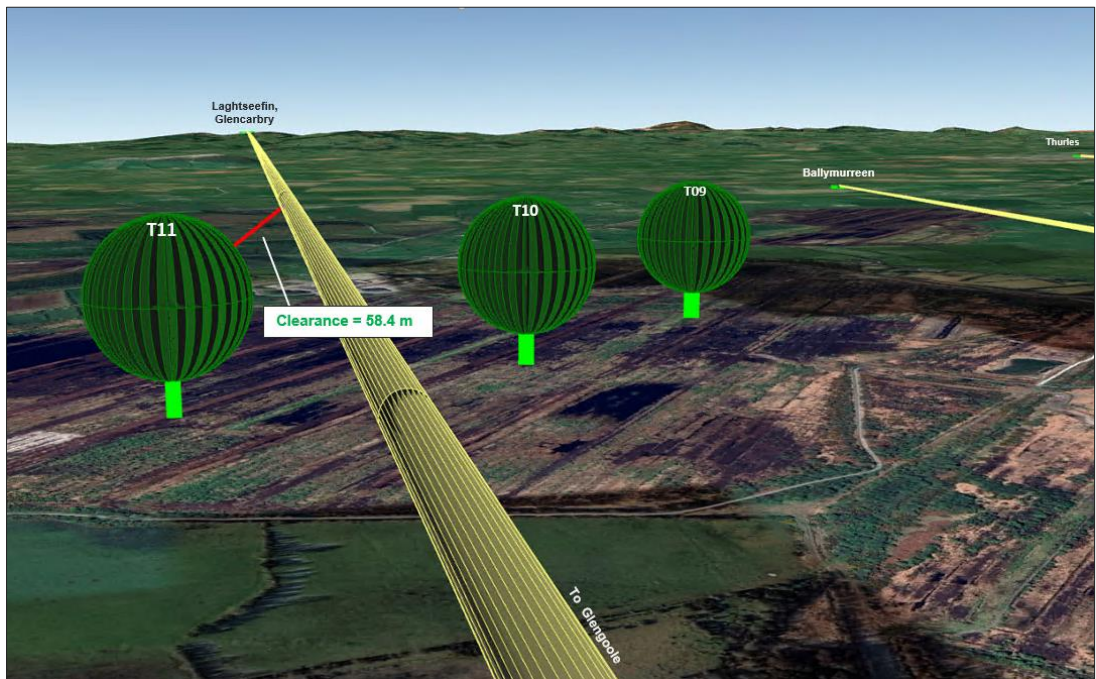


Figure 16. Vodafone Network – 3D View.


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Table 13 below provides a brief summary of the network analysis for the Vodafone network in the vicinity of the proposed wind farm.

Radio Link ID	Link Description	Nearest Turbine	Fresnel Zone (F1) Clearance	Wind Farm Impacts / Observations
VF_L1	Glengoole to Leigh, Twomileborris	T05	> 100 m	No impacts.
VF_L2	Glengoole to Thurles	T09	> 100 m	No impacts.
VF_L3	Glengoole to Ballymurreen	T09	> 100 m	No impacts.
VF_L4	Glengoole to Laghtseefin, Glencarbry	T11	58.4 m	No impacts.
VF_L5	Glengoole to Garranacanty	T11	> 100 m	No impacts.

Table 13. Vodafone Ireland Network – Analysis Summary

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Section 6 - Conclusions

	Procedure: 001	Rev: 2.0
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6. Conclusions

From the findings made in this report the following conclusions have been made:

- The findings from the telecom operator consultations and desktop survey analysis indicate that there are fifteen radio links that cross over/near the wind farm site. The radio links are listed below in Table 14.
- Results from the radio link analysis (2D and 3D) indicate that the proposed turbines would not obstruct any of the fifteen radio links (i.e. the proposed turbine layout would not impact any of the telecom operator networks).

Link No.	Operator	Link Description	Impact of Proposed Turbine Layout
1	Eir	PTP microwave radio link from Glengoogle to Thurles	No Impact
2	Eir	PTP microwave radio link from Curraheen to Glengoole	No Impact
3	Eir	PTP microwave radio link from Thurles to Kilbrannel	No Impact
4	Eir	PTP microwave radio link from Rosoulty to Glengoole	No Impact
5	Enet	PTP microwave radio link from Ballyspellan to Centenary, Ballyduff	No Impact
6	Enet	PTP microwave radio link from Templemore Garda to Garransilly, Urlingford	No Impact
7	ESB	PTP UHF radio link from Thurles 110kV to Glengoole 38kV	No Impact
8	Three	PTP microwave radio link from Killenaule Quarry (Kilbrannel) to AQS Tipperary	No Impact
9	Three	PTP microwave radio link from Ballyspellan to Leigh	No Impact
10	Three	PTP microwave radio link from Littleton to Ballyspellan	No Impact
11	Vodafone	PTP microwave radio link from Glengoole to Leigh, Twomileborris	No Impact
12	Vodafone	PTP microwave radio link from Glengoole to Thurles	No Impact
13	Vodafone	PTP microwave radio link from Glengoole to Ballymurreen	No Impact
14	Vodafone	PTP microwave radio link from Glengoole to Laghtseefin, Glencarbry	No Impact
15	Vodafone	PTP microwave radio link from Glengoole to Garranacanty	No Impact

Table 14. Radio Links in vicinity of Proposed Wind Farm.

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- Figure 17 below is provided to illustrate each of the telecommunication radio links that cross over/near the proposed development site.

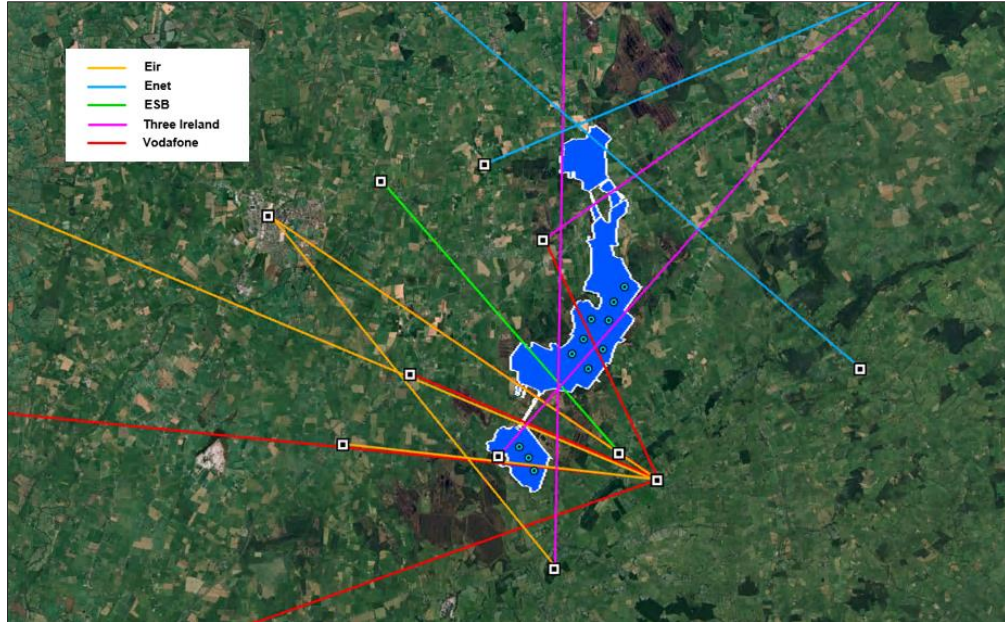



Figure 17. Plan View of Radio Links in vicinity of Proposed Wind Farm

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APPENDIX A – Wind Farm Turbine Coordinates


	Procedure: 001	Rev: 2.0
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Appendix A – Wind Farm Turbine Co-ordinates

The development is in the pre-planning stage and the Final Turbine Layout is yet to be finalized. The turbine layout considered in this Telecommunications Impact Study is provided below.

Turbine ID	Co-ordinates (IG)	
	X	Y
T01	224098.7	157104.2
T02	223775.9	156595.4
T03	223649.5	155989.3
T04	223077.2	155990.4
T05	222863.6	155329.9
T06	223515.3	155037.3
T07	222519.3	154828.9
T08	223074.5	154377.4
T09	220981.9	151714.7
T10	221303.5	151380.6
T11	221509.5	150971.3

Table 15. Wind Farm Layout - Turbine Co-ordinates

 <i>Total Broadband Solutions</i>	Procedure: 001	Rev: 2.0
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APPENDIX B – Field Survey Findings

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025


Appendix B – Field Survey findings

The telecom mast-sites surveyed for this Telecoms Impact Study are shown relative to the proposed wind farm site in Figure 18 below.



Figure 18. Telecom Mast-Sites shown relative to proposed wind farm.

The findings from the field surveys of each of the mast-sites are presented below.

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Mast-Site A (Templemore)


Telecommunications Mast-Site A is located at Templemore, Co Tipperary and is approximately 21 km northwest of the proposed wind farm. A photo of the mast at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 16.



Figure 19. Mast A1

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast A1	Enet

Table 16. Field Survey Summary – Mast-site A

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Mast-Site B (AQS Tipperary)


Telecommunications Mast-Site B is located in the townland of Kiloran, Co Tipperary and is approximately 5 km north of the proposed development. Access to this mast-site was not possible on the day of survey; however, the site location (as specified by Three Ireland) is shown below in **Figure 20**. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in **Table 17**.



Figure 20. Mast B

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast B	Three Ireland

Table 17. Field Survey Summary – Mast B

	Procedure: 001	Rev: 2.0
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Mast-Site C (Ballyspellan, Johnstown)


Telecommunications Mast-Site C is located at Ballyspellan, Johnstown, Co Tipperary and is approximately 11 km northeast of the proposed wind farm. A photo of the mast-structures at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 18.



Figure 21. Mast C1

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast C1	Three Ireland
Mast C2	Enet

Table 18. Field Survey Summary – Mast-site C

	Procedure: 001	Rev: 2.0
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Mast-Site D (Rossully)


Telecommunications Mast-Site D is located in the townland of Rossully, County Tipperary, and is approximately 19 km west of the proposed wind farm. The mast-site location (as specified by Eir) is shown in Figure 22 below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 19.



Figure 22. Mast D

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast D	Eir

Table 19. Field Survey Summary – Mast-Site D

	Procedure: 001	Rev: 2.0
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Mast-Site E (Thurles 110 kV Substation)

Telecommunications Mast-Site E is located at the Thurles ESB 110kV Substation and is approximately 6 km west of the proposed wind farm. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 20.



Figure 23. Mast E

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast E	ESB

Table 20. Field Survey Summary – Mast-Site E

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Mast-Site F (Centenary)

Telecommunications Mast-Site F is located at the Centenary Co-Op at Ballayduff, County Tipperary, and is approximately 3 km west of the proposed development. A photo of the mast-structure at this location is shown below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 21.



Figure 24. Mast F

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast F	Enet

Table 21. Field Survey Summary – Mast-Site F

	Procedure: 001	Rev: 2.0
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Mast-Site G (Thurles)

Telecommunications Mast-Site G is located at Thurles, Co Tipperary and is approximately 9 km west of the proposed wind farm. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 21.



Figure 25. Mast G

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast G	Eir, Vodafone

Table 22. Field Survey Summary – Mast-Site G

	Procedure: 001	Rev: 2.0
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Mast-Site H (Leigh)

Telecommunications Mast-Site H is located in the townland of Leigh approximately 1.5 km west of the proposed wind farm. A photo of the mast at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 23.



Figure 26. Mast H

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast H	Three Ireland, Vodafone

Table 23. Field Survey Summary – Mast-Site H

	Procedure: 001	Rev: 2.0
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Mast-Site I (Garransilly, Urlingford)

Telecommunications Mast-Site I is located in the townland of Garransilly, Urlingford, Co Tipperary and is approximately 8 km east of the proposed development. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 24.



Figure 27. Mast I

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast I	Enet

Table 24. Field Survey Summary – Mast-Site I

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Mast-Site J (Laghtseefin, Glencarbry)

Telecommunications Mast-Site J is located at Laghtseefin, Glencarbry, Co Tipperary and is approximately 26 km west of the proposed wind farm. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 25.




Figure 28. Mast J

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast J	Vodafone

Table 25. Field Survey Summary – Mast-Site J

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Mast-Site K (Ballymurreen)


Telecommunications Mast-Site K is located the townland of Ballymurreen, Co Tipperary and is located approximately 3 km west of the proposed wind farm development site. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 26.



Figure 29. Mast-Site K

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast K	Vodafone

Table 26. Field Survey Summary – Mast-Site K

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Mast-Site L (Glengoogle 38KVa)

Telecommunications Mast-Site L is located at the ESB 38KVa station at Glengoogle, Co Tipperary and is approximately 2 km east of the proposed development. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 27.



Figure 30. Mast L

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast L	ESB

Table 27. Field Survey Summary – Mast-Site L

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Mast-Site M (Curraheen)


Telecommunications Mast-Site M is located at the Horse and Jockey Hotel, Curraheen, Co Tipperary and is approximately 5 km west of the proposed wind farm. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 28.



Figure 31. Mast M

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast M	Eir

Table 28. Field Survey Summary – Mast-Site M

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Mast-Site N (Littleton)

Telecommunications Mast-Site N is located in at Bord na Móna facility at Littleton, County Tipperary and is located within 100 m of the proposed wind farm development. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 29.



Figure 32. Mast N

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast N	Three Ireland

Table 29. Field Survey Summary – Mast-Site N

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Mast-Site O (Glengoose)

Mast-Site O is located in the townland of Glengoose approximately 4 km east of the proposed wind farm development. There are two mast structures at this mast-site referenced in this report as Mast O1 and Mast O2.

Mast O1

A photo of Mast O1 shown in the figure below. The Telecom Operators who have radio links operating from this mast structure in the direction of the wind farm are listed in Table 30.

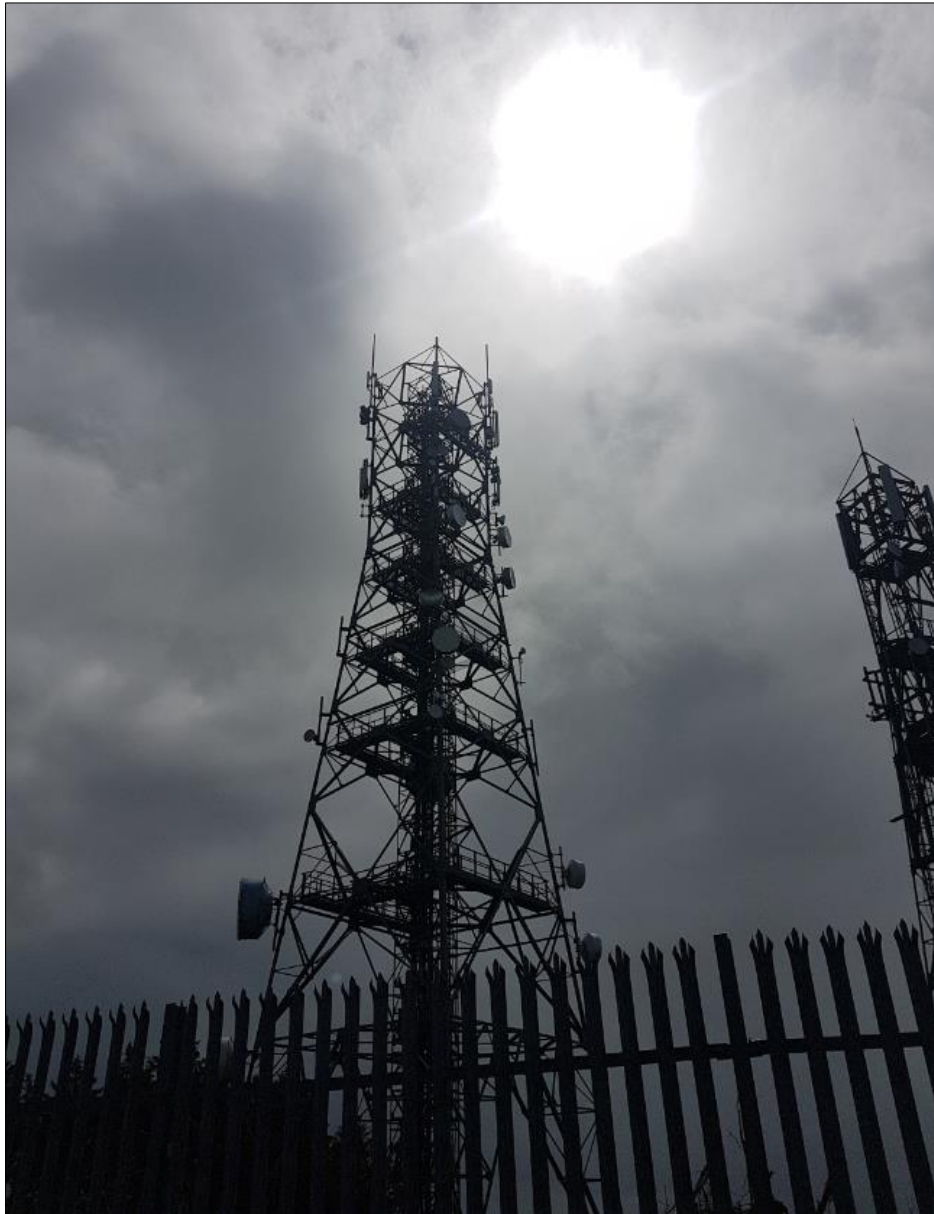



Figure 33. Mast O1

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast O1	Vodafone, Eir

Table 30. Field Survey Summary – Mast O1

	Procedure: 001	Rev: 2.0
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Mast O2


A photo of Mast O2 shown in the figure below. The Telecom Operators who have radio links operating from this mast structure in the direction of the wind farm are listed in Table 31.



Figure 34. Mast O2

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast O2	Eir

Table 31. Field Survey Summary – Mast O2

	Procedure: 001	Rev: 2.0
Title: Littleton Wind Farm Telecommunications Impact Study	Approved: KH	Date: 19/03/2025

Mast-Site P (Killenaule Quarry, Kilbrannel)

Telecommunications Mast-Site P is located at Killenaule Quarry, Kilbrannel, Co Tipperary and is approximately 2.5 km south of the proposed wind farm. Access to this mast-site was not possible on the day of survey; however, the mast location can be seen in the aerial view of the site, shown below in Figure 35. The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 32.




Figure 35. Mast-site P

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast P	Eir, Three Ireland

Table 32. Field Survey Summary – Mast-site P

APPENDIX 15.2

Civil Aviation Review Statement

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Report

Littleton Wind Farm Civil Aviation Review Statement

Document Number: 001/LN/0226


Author: PT\DMG

Approved for Release: Rev 3.0 KH **Date:** 16/02/26

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Executive Summary

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 Littleton. 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 and Navigation Systems
- Radar Surveillance Sensors
- Flight Inspection and Calibration
- IAA - Aeronautical Obstacle Warning Light Scheme
- Private Airfields (VFR Flying)
- Garda Air Support Unit (GASU)


Annex 14 - Obstacles Limitation Surfaces (OLS)

A review shows that the proposed wind farm would be located outside the Outer Horizontal Surface of the Waterford Airport Runway Obstacle Limitation Surfaces (OLS), as defined in ICAO (International Civil Aviation Organization) Annex 14.

As the proposed wind farm is situated outside the Outer Horizontal Surface and there is no penetration of the take-off or approach surfaces, it is unlikely that there will be any impacts to the OLS surfaces for Waterford Airport.

Annex 15 - Aerodrome Surfaces

Following a review of “Terrain and Obstacle Requirements” as defined in ICAO Annex 15, turbines at the proposed development would need to be registered if they are more than 100 meters above terrain. The distance from the centre point (ARP – Airport Reference Point) of Waterford Airport to the boundary of Area 1 of the Annex 15 Aerodrome Surface is 45 km. This area encloses the TMA area i.e. Total Maneuvering Area and this is used for circling and maneuvering by aircraft. Should the proposed wind farm be permitted, the turbines would be outside 45 km of Waterford Airport’s ARP and would not cause an impact on the Annex 15 Aerodrome Surface. However, the proposed turbines would be required to be included in the IAA Electronic Air Navigation Obstacle Dataset.

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Building Restricted Areas (BRA)

A Building Restricted Area is the airspace surrounding an aviation facility that needs to be clear from physical intrusions. The purpose of the safeguarded areas is to identify developments with the potential for causing unacceptable interference to navigation facilities. A review shows that the proposed wind farm is over 55 km from the BRA surfaces at Waterford Airport. At this distance there will be no impacts to the BRAs due to wind turbines at Littleton.

Minimum Sector Altitudes (MSA)

The Minimum Sector Altitudes (MSA) is the lowest altitude which may be used to provide a minimum obstacle clearance of 1000 ft above all obstacles within a sector of 25 nautical miles (46 km) from the NDB at Waterford Airport. As the proposed wind farm is located outside the MSA Sectors for Waterford Airport, there should be no impact on the published MSA altitudes.

Instrument Flight Procedures

There are 6 published Instrument Flight Procedures for flights to/from Waterford Airport. Due to the distance of the proposed wind farm from the airport, and as there are existing obstacles nearer to the airport than the proposed development, there should be no impacts to these flight procedures.

Communications and Navigation Systems


As the proposed wind farm is approximately 61 km from the Localizer and transmitting antennas at Waterford Airport, it is very unlikely that wind turbines at the proposed development will have any impact on these ATS communications and radio navigational aids.

Radar Surveillance Sensors

For Radar Surveillance Systems, EUROCONTROL Guidelines require a 16 km safe distance from the surveillance radar system (SSR), for a “Zone 4 - No Assessment” condition. It has been highlighted in the analysis that turbines located at the proposed farm would be located at a distance of over 65 km from the radar stations at Shannon, Woodcock Hill and Dublin Airport and in Assessment Zone 4 of the EUROCONTROL Guidelines. As turbines at the proposed development would be located in Assessment Zone 4, a detailed impact assessment on Radar Surveillance Systems will not be required by the IAA.

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 Waterford Airport for calibration of instrument landing systems. It is unlikely that the Flight Inspection Procedures will be impacted as the

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proposed wind farm is sufficiently far from the airport runways and the flight inspection procedures should already account for the existing obstacles (e.g. terrain and existing wind farms).

Aeronautical Obstacle Warning Light Scheme

In the event that planning consent is granted, all civil aviation stakeholders (IAA, ANSP and Airport Authorities) are likely to request lighting of the proposed wind turbines in the interest of aviation safeguarding as the proposed development would be considered as obstacles in controlled airspace. The developer would agree to a lighting scheme with all stakeholders.

Private Airfields (VFR Flying)

A due-diligence survey was carried out on the private airfields / helipads in the vicinity of Littleton. It was found that there are two private unlicensed air fields within 10 km of the proposed wind farm site, Lickfinn and Moyne. The proposed wind farm is sufficiently far from each aviation installation that there would be no impact due to the proposed wind turbines. Pilots flying to/from these aviation installations would also be required by law to fly by Visual Flight Rules (VFR) and in accordance with the IAA *Rules of The Air*. The Rules of the Air state, it is the pilot’s legal responsibility to be aware of and avoid any obstacles in his/her flight path and therefore he/she would be required to be aware of wind turbines if flying to/from the airfield in question. This can be achieved by prudent flight planning by the VFR pilot prior to flight.

Garda Air Support Unit (GASU)

A review of GASU operations indicates that they are unlikely to be impacted by the proposed wind farm development.


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Abbreviations

AGL	Above Ground Level
AMSL	Above Mean Sea Level
ARP	Airport Reference Point
BRA	Building Restricted Area
DME	Distance Measuring Equipment
DoD	Department of Defence
GASU	Garda Air Support Unit
GP	Glide Path
HLS	Helicopter Landing Site
IAC	Irish Air Corps
ICAO	International Civil Aviation Organization
IFP	Instrument Flight Procedure
ILS	Instrument Landing System
OLS	Obstacle Limitation Surface
PSR	Primary Surveillance Radar
RWY	Runway
SID	Standard Instrument Departure Route
STAR	Standard Arrival Route
SSR	Secondary Surveillance Radar
NATS	National Air Traffic Services (UK)
NM	Nautical Miles
DVOR	Doppler VHF Omni-directional Range Station

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1. Introduction

This section provides a brief summary of the proposed wind farm development at Littleton and of the nearest significant aviation installation at Waterford Airport.

1.1 Wind Farm Site Information

The proposed wind farm development is located in County Tipperary approximately 61 km northwest of Waterford Airport. Figure 1 shows the proposed wind farm site with respect to Waterford Airport and the IAA radar stations at Shannon Airport and Woodcock Hill.



Figure 1. Location of proposed wind farm at Littleton, Co Tipperary

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1.2 Waterford Airport

Table 2 below shows the co-ordinates of Waterford Airport and the distance from the Airport reference Point (ARP) to the proposed wind farm site. Waterford 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
Kilowen, Co Waterford	International Airport	Single Asphalt Runway Airspace: Class C	52 11 14 N 07 05 13 W (Mid-point of Runway 03/21).	61.5 km

Table 1. Waterford Airport Details

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




Figure 2. Waterford International Airport

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2. Aviation Review

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

- 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 and Navigation Systems
- Radar Surveillance Sensors
- Flight Inspection and Calibration
- Aeronautical Obstacle Warning Light Scheme
- Private Airfields (VFR Flying)
- Garda Air Support Unit (GASU)

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2.1 Annex 14 Obstacle Limitation Surfaces (OLS)

A review of the Annex 14 Obstacles Limitation Surfaces (OLS) was first carried out by first plotting the proposed wind farm location and the airport obstacle surfaces. The obstacle limitation surfaces for Waterford 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 OLS in relation to the proposed Littleton wind farm. The distance from the ARP at Waterford Airport (i.e. the runway centre-point), to the nearest of the proposed turbines is over 60 km. The analysis of the OLS plots indicates that turbines at the proposed wind farm would not penetrate the Outer Horizontal Surface which extends to 15 km from the Airport Reference Point (ARP) or runway centre-point.

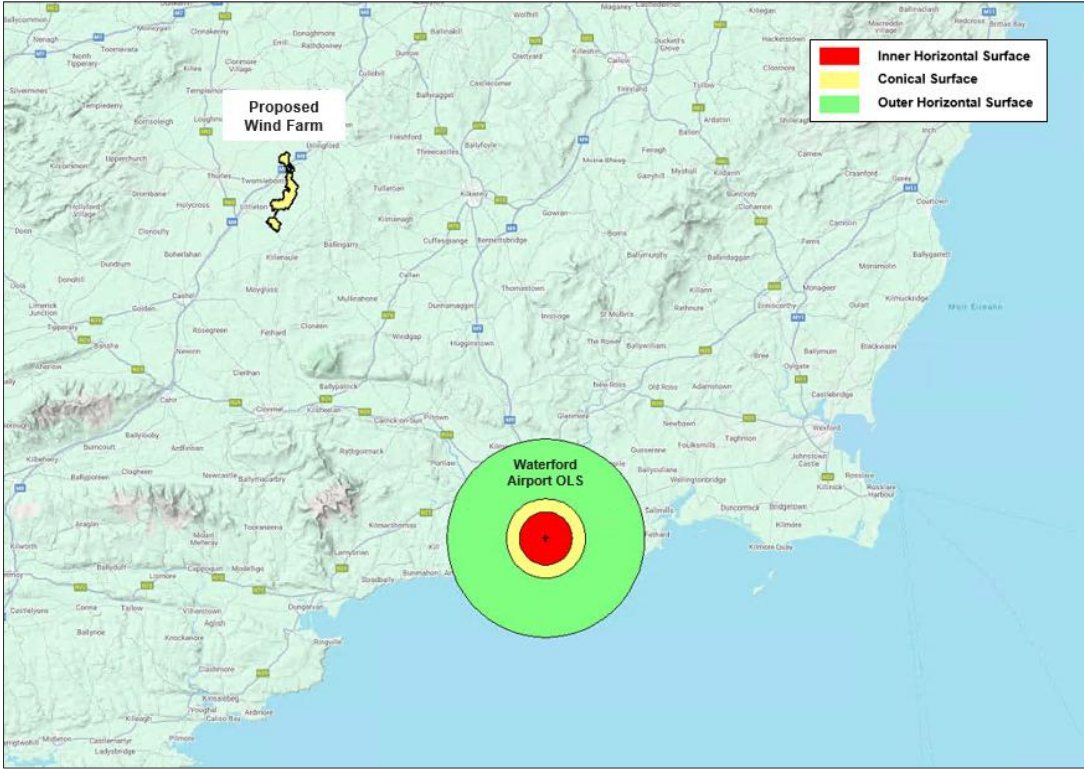



Figure 3. Littleton Wind Farm in relation to Waterford Airport OLS.

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Annex 14 Obstacle Limitation Surfaces	No action.	None

Table 2. Aviation Impact Review - Annex 14 Obstacle Limitation Surfaces

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2.2 Annex 15 Aerodrome Surfaces

Turbines at the proposed wind farm would not penetrate the ICAO Annex 15 Aerodrome Surface as shown in Figure 4. The “Terrain and Obstacle Requirements Area” is defined in ICAO Annex 15 as an area of up to 45 km from the Aerodrome ARP. (An illustration of ICAO Annex 15 Area 1 and Area 2 Surface is provided in Appendix A).

As the nearest turbine at the proposed wind farm would be more than 45 km from the ARP at Waterford Airport, there will be no penetration of the Annex 15 surface for the Waterford Aerodrome. All obstacles, if they are more than 100 meters above terrain for a distance of up to 45 km from the ARP, need to be registered in the IAA Air Navigation Obstacle Data Set. This area is known as the TMA area i.e. Terminal Maneuvering Area and is used for en-route circling and maneuvering and is shown in Figure 4.

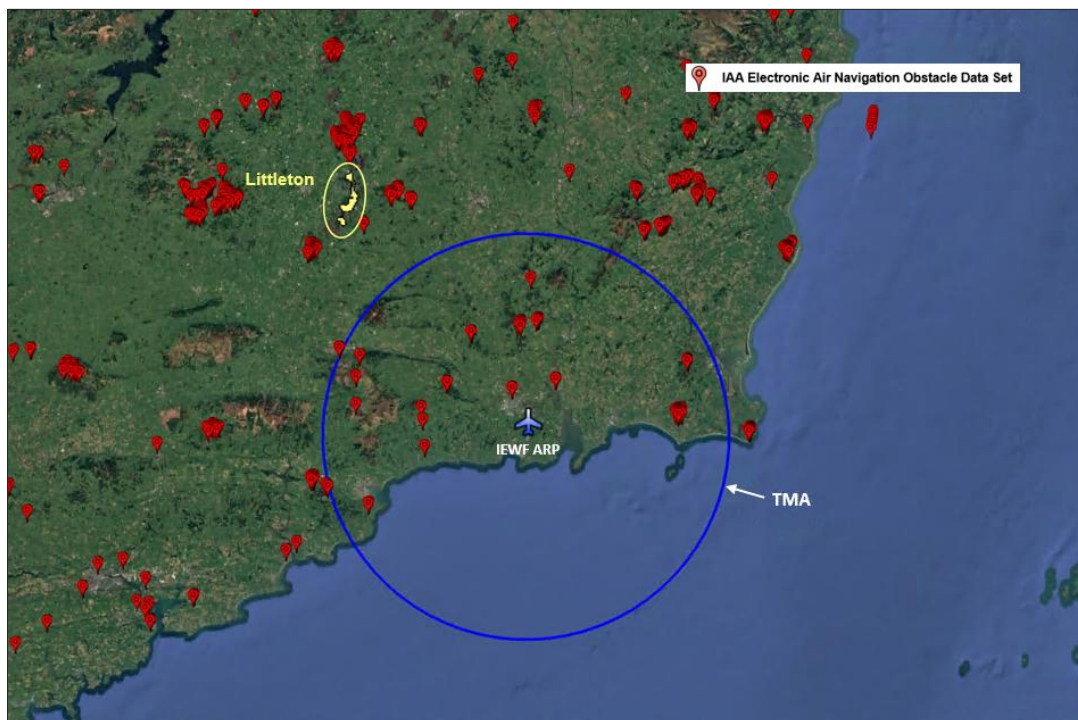


Figure 4. Annex 15 Aerodrome Surface and IAA Electronic Air Navigation Obstacle Data Set

It should also be noted that there are other existing tall structures (obstacles) nearer to the airport, e.g. the operational wind farms at Foyle, Ballybay, Ballincurry, An Cnoc, Ballymartin and Rahora.

These existing obstacles would shield any potential impacts from the proposed wind farm at Littleton. The IAA Electronic Air Navigation Obstacle Data Set permitted obstacles are shown relative to the proposed wind farm in Figure 5.

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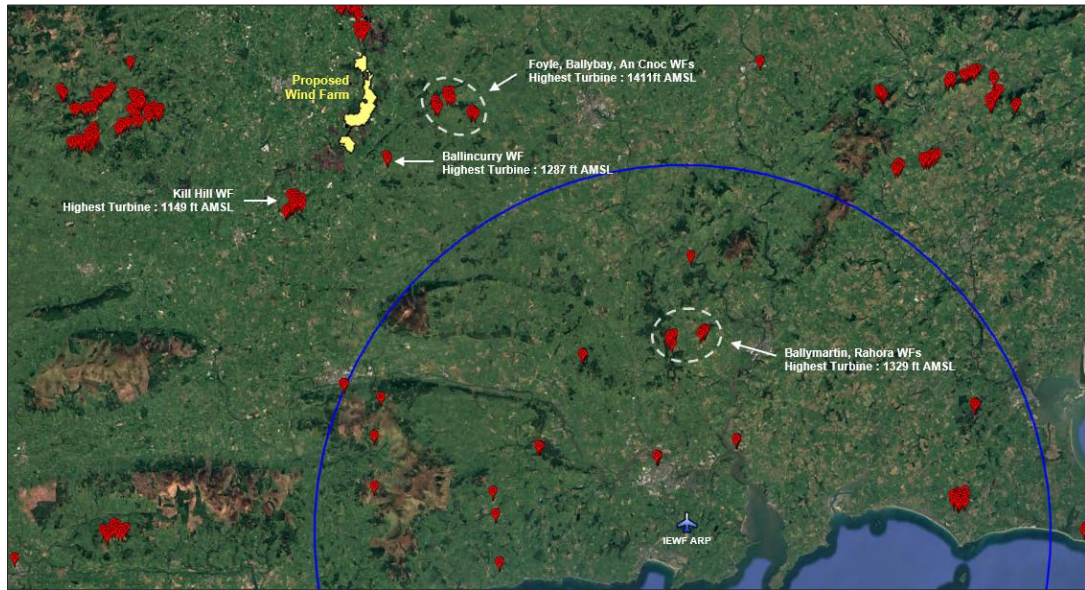


Figure 5. Operational and Permitted Obstacles in vicinity of Littleton Wind Farm

Although there are other obstacles closer to the airport than 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.

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Annex 15 Aerodrome Surfaces	The proposed wind turbines would be required to be included in the IAA Obstacle Data Set.	None

Table 3. Aviation Impact Review - Annex 15 Aerodrome Surfaces

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2.3 Building Restricted Areas (BRA)

A Building Restricted Area is the airspace surrounding an aviation facility that needs to be clear from physical intrusions. The purpose of the safeguarded areas is to identify developments with the potential for causing unacceptable interference to navigation facilities.

The navigation facilities to be considered at Waterford Airport are the ILS Localisers, Glidepaths, NDB and DMEs that provide guidance for aircraft landing on runways 03 and 21. The minimum safeguarded areas for these facilities are defined by the International Civil Aviation Organisation (ICAO) in the document ICAO EUR DOC 015, Section 7. The BRA parameters as specified by the ICAO are provided in Appendix B of this report.

Figure 6 below illustrates that the proposed wind farm at Littleton is over 55 km from the Waterford BRA (safeguarded area for Runways 03 and 21). At this distance turbines at the proposed wind farm will have no impact on the navigation facilities associated with the Building Restricted Areas for Waterford Airport.



Figure 6. Proposed Wind Farm relative to Waterford Airport BRA (RWY 03 and 21)

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Building Restricted Areas	No action.	None

Table 4. Aviation Impact Review - Building Restricted Areas

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2.4 Minimum Sector Altitudes

A review of the Minimum Sector Altitudes (MSA) shows that turbines at the proposed wind farm would not be inside 25 nautical miles of the NDB at Waterford Airport. The MSA provides a minimum obstacle clearance of 1000 ft above the highest obstacle within specified sectors.

The proposed wind farm is located outside the MSA Sectors for Waterford Airport as shown in Figure 7. Therefore, there will be no impact on the published MSA altitude figures.

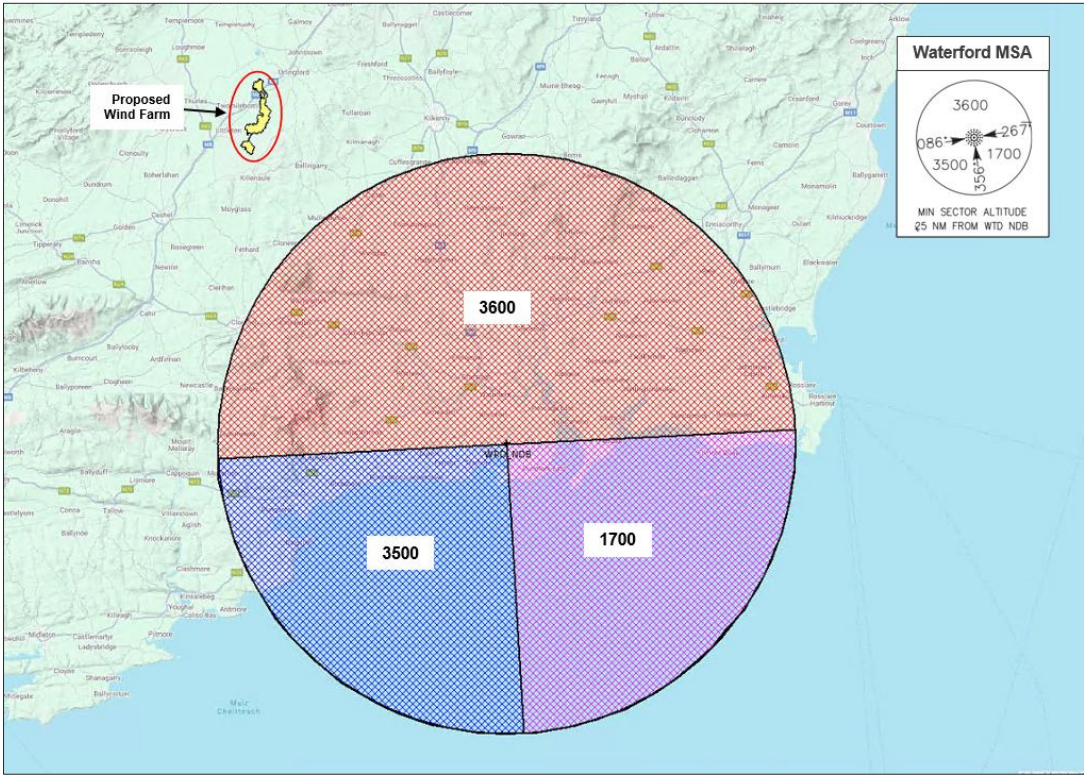



Figure 7. Waterford Airport (EIWF) Minimum Sector Altitudes

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Minimum Sector Altitudes	No action	None

Table 5. Aviation Impact Review - Minimum Sector Altitudes

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2.5 Instrument Flight Procedures

There are 6 published Instrument and Visual Flight Procedures for arrivals to and departures from Waterford Airport.

Due to the distance of the proposed wind farm from the Airport (and as there are existing obstacles (e.g. telecom masts and existing wind farms)) it is unlikely that there will be any impacts on the Instrument Flight Procedures for flights to/from Waterford Airport. Table 6 below lists the Instrument Flight Procedures for Waterford Airport.

Aerodrome	Aerodrome Procedure	Chart ID	Likely WF Impacts
Waterford	Instrument Approach Chart ILS/NDB/DME RWY 21 – ICAO	EIWF AD 2.24-3.1	None.
Waterford	Instrument Approach Chart NDB/DME RWY 21 – ICAO	EIWF AD 2.24-5	None.
Waterford	Instrument Approach Chart NDB/DME RWY 03 – ICAO	EIWF AD 2.24-6.1	None.
Waterford	Visual Approach Chart – ICAO	EIWF AD 2.24-7	None.
Waterford	Instrument Approach Chart RNP RWY 02 – ICAO	EIWF AD 2.24-8	None.
Waterford	Instrument Approach Chart RNP RWY 20 – ICAO	EIWF AD 2.24-9	None.

Table 6. Instrument and Visual Flight Procedures – Waterford 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 it is unlikely that the Air Navigation Service Provider (ANSP) at Waterford Airport will require a detailed assessment on the possible impact of the proposed wind farm on the flight procedures.

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Instrument Flight Procedures	No action	None.

Table 7. Aviation Impact Review - Instrument Flight Procedures


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2.6 Operational Permitted Wind Farms in vicinity of Proposed Wind Farm

The Planning References for the permitted wind farms in the vicinity of the proposed wind farm are shown below in Table 8. None of these wind farms required a Full Assessment of Instrument Flight Procedures.

Wind Farm	Planning Reference	Status
Lisdowney, Co. Kilkenny	12/172	Operational Wind Farm
Lisheen, Co. Tipperary	14/202	Operational Wind Farm
Bruckana, Co. Laois & Kilkenny	10/145	Operational Wind Farm
Foyle	12/378	Operational Wind Farm
Ballybay	12/533	Operational Wind Farm
An Cnoc, Co. Tipperary	09/781	Operational Wind Farm
Ballincurry, Co. Tipperary	PL92.245874	Operational Wind Farm
Gortahile, Co. Laois	04/935	Operational Wind Farm
Rahora, Co. Kilkenny	03/1117	Operational Wind Farm
Ballymartin, Co. Kilkenny	07/2141	Operational Wind Farm
Pinewood, Co. Laois	16/260	Permitted Wind Farm

Table 8. Operational and Permitted Wind Farms in vicinity of Proposed Wind Farm

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2.7 Communications and Navigation Systems

The AIP document EIWD AD 2-18/19 provides the information for communication and navigation facilities for Waterford Airport. The table below shows the channel frequencies for the ATS communications Facilities and the Radio Navigation and Landing Aids for the airport.


Aerodrome	ATS Communications Facilities Channel Frequency	Radio Navigation and Landing Aids Channel Frequency	Approximate Distance to Localizer and Transmitting antennas	Impacts of wind farm
Waterford	121MHz -130MHz	110KHz – 331MHz	61 km	No impacts

Table 9. Impacts on Communications and Navigation Systems

As the proposed wind farm is approximately 61 km from the Localizer 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.

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Communication and Navigation Systems	No action	None

Table 10. Aviation Impact Review - Communication and Navigation Systems

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2.8 Radar Surveillance Sensors

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 11. 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 12. 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.”

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 Shannon Airport, Woodcock Hill and Dublin Airport. These radar sites are shown relative to the proposed wind farm in Figure 8 below.

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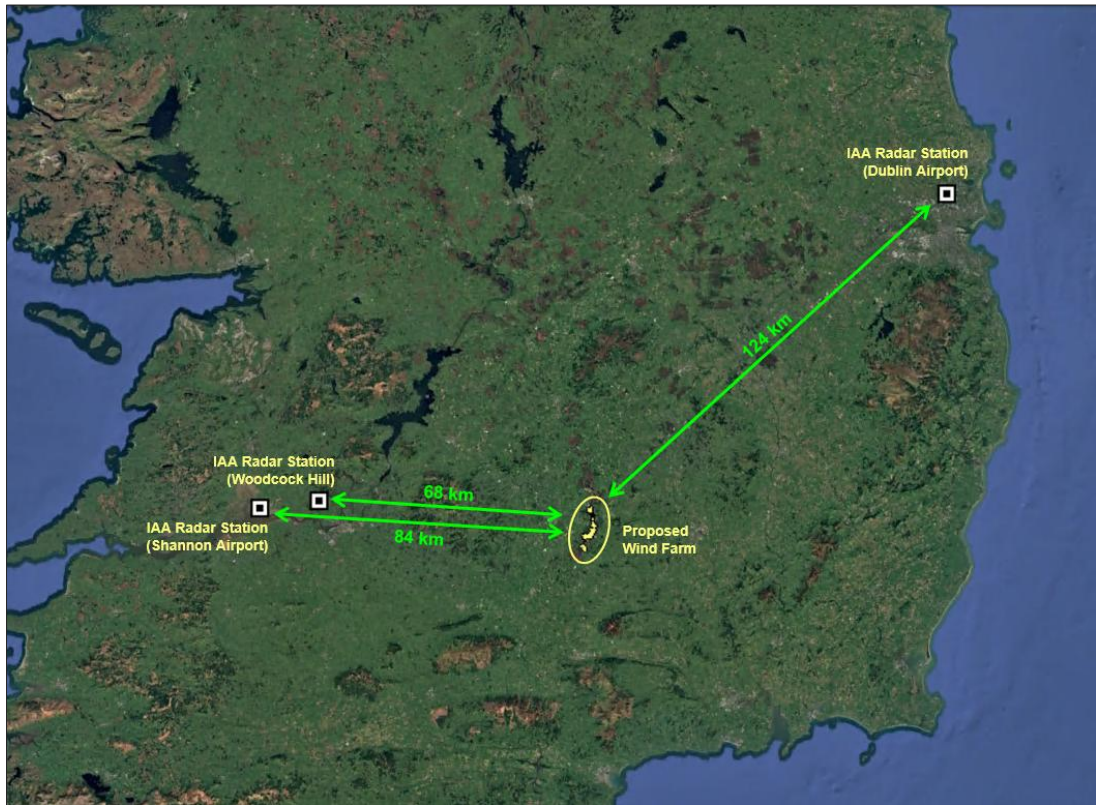


Figure 8. Radar Surveillance Sites relative to Littleton Wind Farm.

A review of each radar station is provided in Sections 2.8.1 to 2.8.3 that follow. The findings of the review indicate that the proposed wind farm is sufficiently far from the radar stations that there would be no impacts, and a detailed radar assessment would not be required by the IAA.

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Radar Surveillance Sensors	No action	None

Table 13. Aviation Impact Review - Radar Surveillance Sensors

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2.8.1 Shannon Airport 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 on the same structure at Shannon Airport (Figure 9).



Figure 9. Shannon Airport Radar Station

Table 14 below shows the (EuroControl & NATS) assessment zone applicable to the nearest point where a turbine could potentially be located. The applicable assessment zone has been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

Wind Farm ID	Distance to PSR/SSR Radar Station	Radar LOS Assessment (EuroControl Guidelines)	Radar LOS Assessment (NATS Guidelines – UK)
Littleton	84 km	Detailed Assessment Not Required	Detailed Assessment Not Required

Table 14. EuroControl / UK Safeguarding Guidelines – Shannon Airport Radar Station

As the table above show, the proposed wind farm is within Assessment Zone 4 as specified by the EUROCONTROL guidelines, which would indicate that a detailed technical assessment would not be required for the impact on the PSR/SSR radar station at Shannon Airport.

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2.8.2 Woodcock Hill Radar Assessment

The radar surveillance site at Woodcock Hill consists of a SSR system housed in the dome-shaped structure shown in Figure 10.




Figure 10. Woodcock Hill Radar Station

Table 15 below shows the (EuroControl & NATS) assessment zone applicable to the nearest point where a turbine could potentially be located. The applicable assessment zone has been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

Wind Farm ID	Distance to PSR/SSR Radar Station	Radar LOS Assessment (EuroControl Guidelines)	Radar LOS Assessment (NATS Guidelines – UK)
Littleton	68 km	Detailed Assessment Not Required	Detailed Assessment Not Required

Table 15. EuroControl / UK Safeguarding Guidelines – Woodcock Hill Radar Station

As the table above show, the proposed wind farm is within Assessment Zone 4 as specified by the EUROCONTROL guidelines, which would indicate that a detailed technical assessment would not be required for the impact on the SSR radar station at Woodcock Hill.

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2.8.3 Dublin Airport Radar Assessment

The radar surveillance site at Dublin Airport consists of two PSR/SSR (MSSR) radar stations as shown below in Figure 11 and Figure 12.



Figure 11. Dublin Airport MSSR Radar Station #1



Figure 12. Dublin Airport MSSR Radar Station #2


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Table 16 below shows the (EuroControl & NATS) assessment zone applicable to the nearest point where a turbine could potentially be located. The applicable assessment zone has been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

Wind Farm ID	Distance to PSR/SSR Radar Station	Radar LOS Assessment (EuroControl Guidelines)	Radar LOS Assessment (NATS Guidelines – UK)
Littleton	124 km	Detailed Assessment Not Required	Detailed Assessment Not Required

Table 16. EuroControl / UK Safeguarding Guidelines – Dublin Airport Radar (Station #1 and #2)

As the table above show, the proposed wind farm is within Assessment Zone 4 as specified by the EUROCONTROL guidelines, which would indicate that a detailed technical assessment would not be required for the impact on the PSR/SSR at Dublin Airport.

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2.9 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 Waterford Airport for calibration of instrument landing systems.

It is unlikely that the Flight Inspection Procedures will be impacted as the proposed wind farm is sufficiently far from the airport runways and the flight inspection procedures should already account for the existing obstacles (e.g. terrain and existing wind farms).

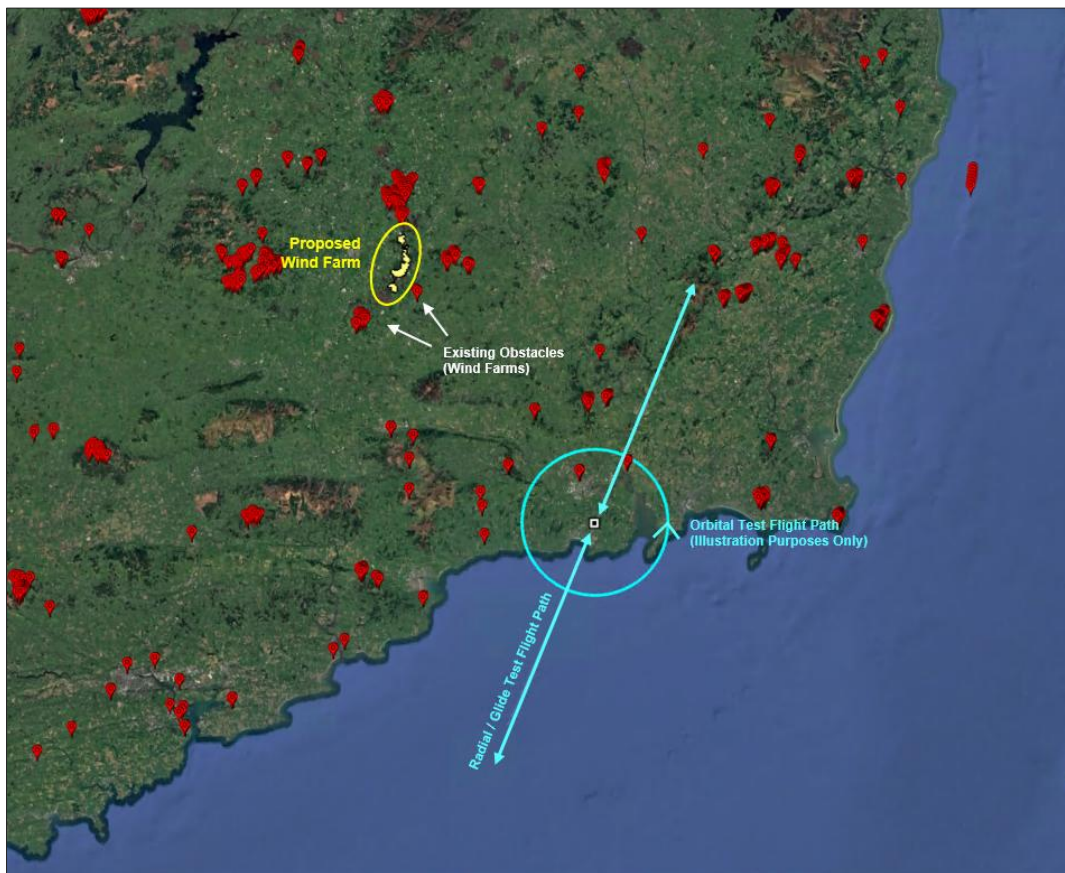



Figure 13. Flight Inspection and Calibration Test Procedures should account for existing obstacles (e.g. terrain and existing wind farms)

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Flight Inspection and Calibration	No action	None

Table 17. Aviation Impact Review - Flight Inspection and Calibration

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2.10 Aeronautical Obstacle Warning Light Scheme

In the event of planning consent being granted, all civil aviation stakeholders (IAA, ANSP and Airport Authorities) would require the lighting of the proposed wind turbines in the interest of aviation safeguarding as the proposed wind turbine development would be considered as obstacles in controlled airspace. The developers of the proposed turbines would agree to implement an aeronautical obstacle warning lighting scheme with all affected aviation stakeholders.


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.”

In the event of planning consent being granted, the IAA would also request AirNav Ireland and any affected Airport Authorities would be informed by the developer of the 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.

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Aeronautical Obstacle Warning Light Scheme	It is likely that all civil aviation stakeholders would 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.	None, subject to agreement of a lighting scheme
Crane Operations	Any affected Airport Authorities would be informed by the developer of the 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.	None, subject to 30 days notification of intention to commence crane operations.

Table 18. Aviation Impact Review - Aeronautical Obstacle Warning Light Scheme

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2.11 Private Airfields (VFR Flying)

For due diligence purposes, private airfields and heliports in the vicinity of Littleton have been considered and it was found that there are two private airfields within 10 km of the proposed wind farm site: Lickfinn Airfield, and Moyne Airfield.

These aviation installations operate in un-controlled Class G airspace and flights in and out of these airfields are required by law to fly by Visual Flight Rules (VFR) and in accordance with the IAA *Rules of The Air*.

ID	Location	Installation Type	Description
Lickfinn Airfield	Lickfinn, Glengoole, Co. Tipperary.	Private Unlicensed Airfield.	Airfield with single grass-strip runway.
Moyne Airfield	Moyne, Co Tipperary	Private Unlicensed Airfield.	Airfield with single grass-strip runway.

Table 19. Private Airfield / Heliport Details

A review of the possible impacts of the proposed wind farm on both of the above-listed airfields is provided in Section 2.11.1 and Section 2.11.2. The findings of the review indicate that the proposed wind farm would have no impact on these airfields.

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Private Airfields (VFR Flying)	No action.	None

Table 20. Aviation Impact Review - Private Airfields (VFR Flying)

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2.11.1 Lickfinn Airfield

This airfield is located in the townland of Lickfinn, Co Tipperary and is 3.4 km from the nearest of the proposed turbines at Littleton. The location of the airfield relative to the proposed wind farm is shown below in Figure 14 and a close-up aerial view of the airfield is shown in Figure 15. The airfield is used for light aircraft only (i.e. small airplanes, helicopters, microlights, etc.) and flights in and out of this airfield are required by law to fly by Visual Flight Rules (VFR) and in accordance with the *IAA Rules of The Air*.

The Rules of the Air state, it is the pilot’s legal responsibility to be aware of and avoid any obstacles in his/her flight path and therefore he/she would be required to be aware of wind turbines if flying to/from the airfield in question. This can be achieved by prudent flight planning by the VFR pilot prior to flight. It should also be noted that the existing turbines at Ballincurry wind farm are located much nearer to the airfield than the proposed turbines at Littleton.

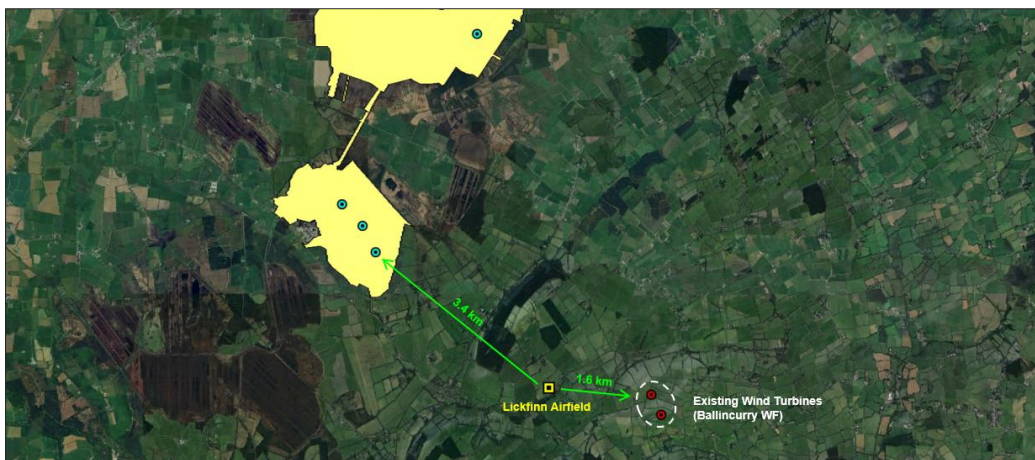


Figure 14. Location of Lickfinn Airfield




Figure 15. Close-up Aerial View – Lickfinn Airfield

As the proposed turbines are 3.4 km from the airfield and as pilots are required to fly by VFR rules and in accordance with the rules of the air, there would be no impact to Lickfinn Airfield due to the proposed development at Littleton.

Airfield / Helipad	Description	Wind Farm Impacts
Lickfinn Airfield	Private grass-strip airfield, 3.4 km southeast of proposed wind farm.	No Impacts.

Table 21. Impacts of proposed wind farm on Lickfinn Airfield.

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2.11.2 Moyne Airfield

This airfield is located in the townland of Moyne, Co Tipperary and is 5.9 km from the nearest of the proposed turbines at Littleton. The location of the airfield relative to the proposed wind farm is shown below in Figure 16 and a close-up aerial view of the airfield is shown in Figure 17. Although the airfield is listed in some aeronautical material, investigations indicate that the airfield has not been operational since 2016. The aerial view of the site also indicates there is no existing runway at Moyne.

The airfield would have previously been used for light aircraft only (i.e. small airplanes, helicopters, microlights, etc.) and any flights in and out of the airfield would have been required by law to fly by Visual Flight Rules (VFR) and in accordance with the *IAA Rules of The Air*.

The Rules of the Air state, it is the pilot’s legal responsibility to be aware of and avoid any obstacles in his/her flight path and therefore he/she would be required to be aware of wind turbines if flying to/from the airfield in question. This can be achieved by prudent flight planning by the VFR pilot prior to flight.

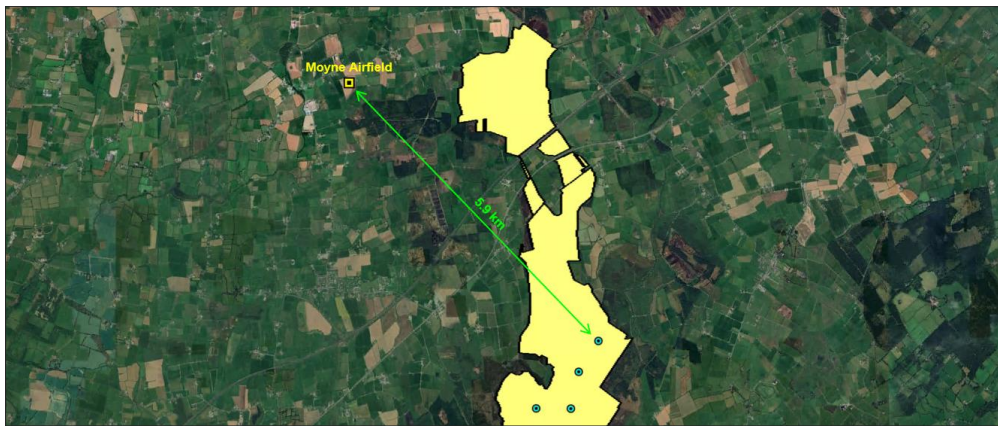


Figure 16. Location of Moyne Airfield




Figure 17. Close-up Aerial View – Moyne Airfield (showing no evidence of existing runway)

As the proposed turbines are more than 5 km from the airfield site and as pilots are required to fly by VFR rules and in accordance with the rules of the air, there would be no impact to the Moyne Airfield due to the proposed development at Littleton.

Airfield / Helipad	Description	Wind Farm Impacts
Moyne Airfield	Private grass airfield, 5.9 km north of proposed wind farm. (Airfield has not been operational since 2016)	No Impacts.

Table 22. Impacts of proposed wind farm on Moyne Airfield.

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2.12 Garda Air Support Unit (GASU)

The Garda Air Support Unit is based at Casement Aerodrome, Baldonnel and is typically deployed to incidents in the following cases:

- Immediate threat to life
- Incidents of a criminal, terrorist or other nationally important nature
- Immediate threat of serious public disorder
- Tasks leading to the prevention or detection of crime
- Evidence gathering
- Intelligence gathering
- Photographic tasks
- Traffic Management/Monitoring


The unit consists of one fixed-wing aircraft (a de Havilland Canada-6 Twin Otter Guardian 400 aircraft) and two helicopters (Eurocopter EC 135 T2).



Figure 18. GASU - Pilatus Britten-Norman BN 2T-4S Defender 4000



Figure 19. GASU - Eurocopter EC135 T2

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The proposed wind farm is located in an area that is sparsely populated and on boggy terrain. For these reasons, it is highly unlikely that the proposed wind farm development would have any significant impacts on GASU operations.


In the unlikely event of GASU operations in the general area, it should be noted that all modern aircraft are equipped with a range of Global Navigation Satellite Systems (GNSS), e.g. GPS, GLNASS, Galileo, etc. These GNSS systems provide pilots with accurate navigation information including data to avoid obstacles during VFR operations. Should the proposed wind farms be permitted the associated turbine locations would be submitted to the IAA and aviation charts and GNSS databases would be updated accordingly.

GASU Aircraft	Impact of proposed wind farms - Opinion
Fixed-wing Airplane (Pilatus Britten-Norman BN 2T-4S Defender 4000)	Low – Fixed-wing aircraft are unlikely to be deployed in low level activity in the subject areas. In addition, the aircraft would be equipped with modern communications systems and navigational equipment. Should the wind farm be permitted, the turbines would be fitted with aeronautical lighting and would be clearly marked in aviation charts.
Helicopter (Eurocopter EC135 T2)	Low – Helicopter landings in the subject area would not occur as the proposed wind farm located in boggy terrain. In addition, the aircraft would be equipped with modern communications systems and navigational equipment. Should the wind farm be permitted, the turbines would be fitted with aeronautical lighting and would be clearly marked in aviation charts.

Table 23. Impact of proposed wind farm on GASU Operations

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Garda Air Support Unit (GASU)	No action.	None

Table 24. Aviation Impact Review - GASU


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3. Summary

A summary of the aviation review for the proposed wind farm at Littleton is provided in Table 25 below.

Item	Impact	Summary
Annex 14 - Obstacle Limitation Surfaces (OLS)	None	The proposed turbines are located outside the OLS Surfaces for Waterford Airport.
Annex 15 - Aerodrome Surfaces	None	Turbines at the proposed wind farm would not penetrate the ICAO Annex 15 Aerodrome Surface for Waterford Airport. All obstacles, if more than 100 meters above terrain for a distance of 45km from center point of Waterford Airport, need to be registered in the IAA Air Navigation Obstacle Data Set. The IAA may request that the turbines be included in the IAA Aeronautical Electronic Obstacle Data Sets. It should be noted that other existing tall structures nearer to Waterford Airport (e.g. existing turbines at Foyle, Ballybay, An Cnoc, Ballincurry, Kill Hill, Ballymartin and Rahora etc.) are also located within the ICAO Annex 15 Aerodrome Surface and are already listed in the IAA Aeronautical Electronic Obstacle Data Sets.
Building Restricted Areas	None	A review shows that Littleton is over 55 km from the BRAs for Waterford 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 outside 25 nautical miles from the NDB at Waterford Airport. Therefore the MSA of the relevant sector will not be affected and there will be no impact on the published MSA altitude figures.
Instrument Flight Procedures	None	A review shows that the proposed wind farm is sufficiently far from Waterford Airport that it is highly unlikely that there would be any impacts to instrument flight procedures for flights to/from the airport for precision aircraft.
Communications and Navigation Systems	None	As the proposed wind farm is approximately 61 km from the Localizer and transmitting antenna at Waterford Airport, it is very unlikely that the proposed development will have any impact on these ATS communications and radio navigational aids.
Radar Surveillance Sensors	None	The proposed wind turbines would be located in Assessment Zone 4 (EuroControl guidelines) for SSR and PSR instruments and a detailed Impact Assessment will not be required
Flight Inspection and Calibration	None	A review of the Flight Inspection Procedures indicates that there will be no impact due to the proposed wind farm development.
Aeronautical Obstacle Warning Light Scheme	None	It is likely that all civil aviation stakeholders (IAA, ANSP and Airport Authorities) would request that the wind farm, if permitted, would be fitted with Aeronautical Obstacle Warning Lights in accordance with industry standards. The developer would agree to implement an aviation lighting scheme.
Private Airfields	None	An assessment of private airfields in the vicinity of Littleton indicates that there will be no impact due to the proposed development.
Garda Air Support Unit	None	An assessment of GASU operations indicates that they are unlikely to be impacted by the proposed wind farm development.

Table 25. Littleton Wind Farm – Aviation Review Summary

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APPENDIX A - ICAO Annex 15 Area 1 and Area 2 Surfaces.

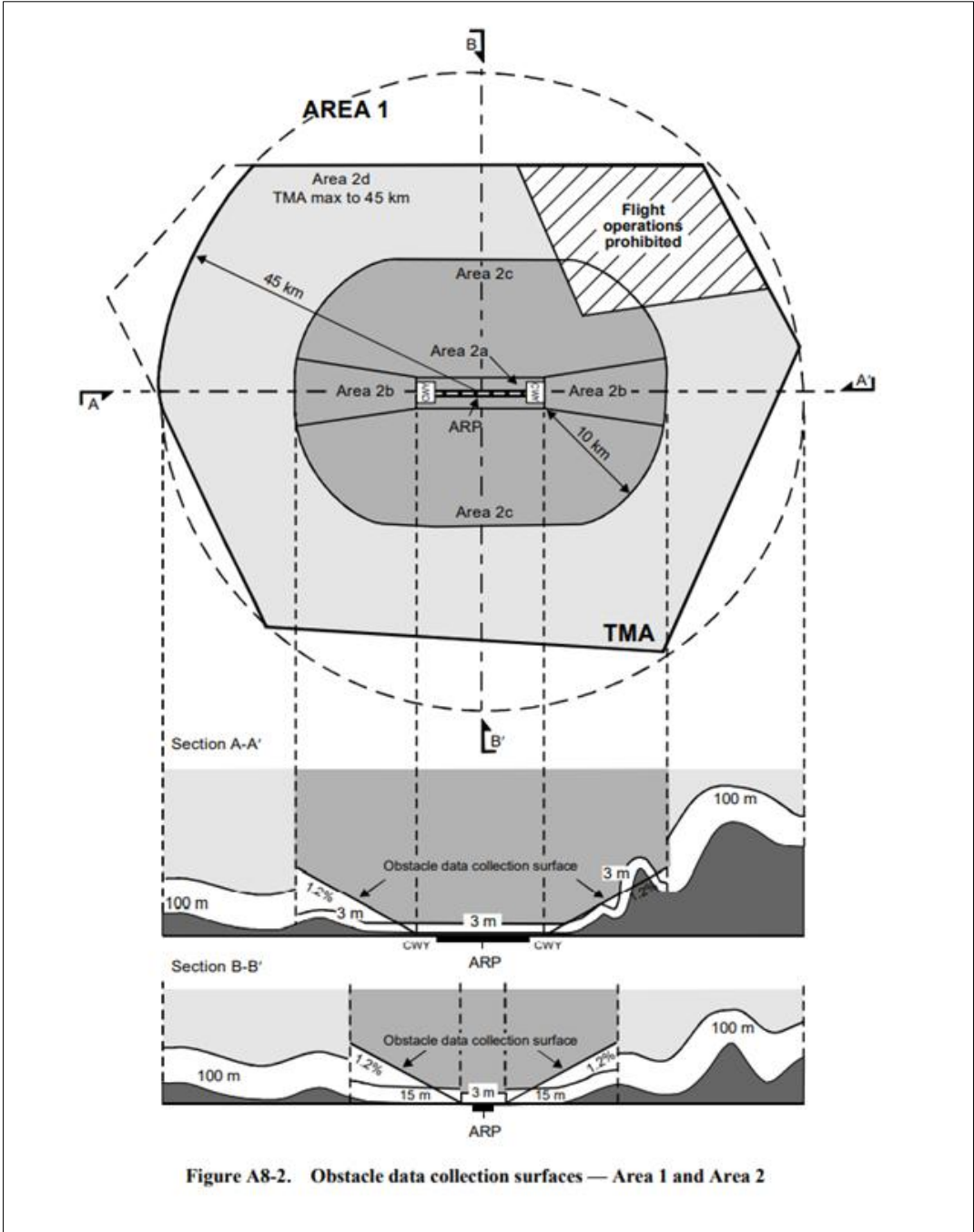


Figure A1 - ICAO Annex 15 Area 1 and Area 2 Surfaces.

APPENDIX B - ICAO Building Restricted Areas.

Figure B1 below shows an example BRA shape for directional facilities. Table B1 provides harmonized guidance figures for the directional navigational facilities in accordance with Figure B1.

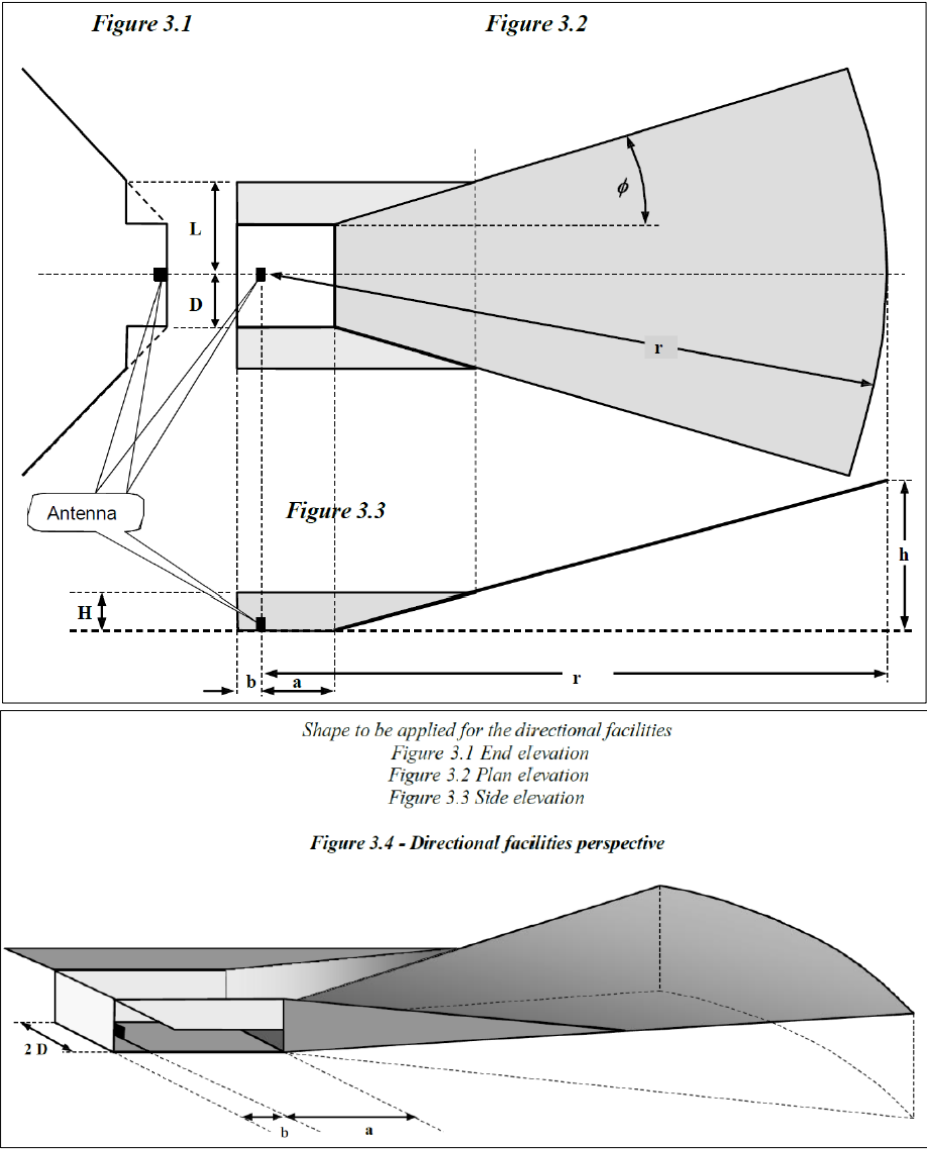



Figure B1 - Example BRA shape for directional facilities (ICAO EUR DOC 015 Figures 3.1-3.4)

Type of navigation facilities	A (m)	b (m)	h(m)	r (m)	D (m)	H (m)	L (m)	ϕ (°)
ILS LLZ (medium aperture single frequency)	Distance to threshold	500	70	a+6000	500	10	2300	30
ILS LLZ (medium aperture dual frequency)	Distance to threshold	500	70	a+6000	500	20	1500	20
ILS GP M-Type (dual frequency)	800	50	70	6000	250	5	325	10
MLS AZ	Distance to threshold	20	70	a+6000	600	20	1500	40
MLS EL	300	20	70	6000	200	20	1500	40
DME (directional antennas)	Distance to threshold	20	70	a+6000	600	20	1500	40

Table B1 - Harmonized guidance figures for the directional navigational facilities (ICAO EUR DOC 015 Table 2)

APPENDIX 15.3

Department of Defence - AirCorps Aviation Review Statement

 <small>Total Communications Solutions</small>	Procedure: 001	Rev: 4.0
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Report

Littleton Wind Farm *Department of Defence – Irish Air Corps* *Aviation Review Statement*

Document Number: 001/LN/0226


Author: Kevin Hayes

Approved for Release: Rev 4.0 KH **Date:** 02/03/26

Document Filename: *Littleton Wind Farm – DoD – IAC Aviation Review Statement*

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Executive Summary

Ai Bridges Ltd have been commissioned to review the potential impacts of the proposed wind farm on Department of Defence / Irish Air Corps aviation systems in the vicinity of the proposed wind farm development at Littleton. As part of the screening review, the following aeronautical subjects were considered:

- Department of Defence Aeronautical Safeguarding
- Emergency Aeromedical Service (EAS)

Department of Defence Aeronautical Safeguarding

The Irish Air Corps position on wind farms / tall structures are outlined in the paper which was published in 2014: “*Air Corps Wind Farm/ Tall Structures Position Paper*”. In the position paper the Irish Air Corps outlines restricted areas where they would object to the installation of wind turbines /tall structures. The areas defined by the Air Corps have been mapped and analysis shows that the proposed wind farm site is partially located within a critical low level flying route (i.e. within 3 NM of the M8 motorway).


Although a section of the proposed wind farm site is located within 3 NM of the M8 motorway, it should be noted that low-level flight maneuvers overhead the M8 are subject to the given operational requirements which would consider high terrain to the southeast of the motorway, as part of the pilot’s route plan. Any change to the existing obstacle baseline (i.e. introduction of obstacles such as wind turbines, would likely require a detailed technical assessment by the Irish Air Corps).

Aeronautical Obstacle Warning Light Scheme

The Department of Defence (DoD) aviation lighting requirements are for illumination 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. There is an additional requirement that Obstacle lighting may be incandescent and if LED or other lighting types are used should be a type visible to Night Vision equipment. The DoD also require that 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. The developer of the proposed wind farm development would agree to implement an aviation lighting scheme.

Emergency Aeromedical Service (EAS)

The standard concerns that are being raised in recent consultations with the Irish Air Corps highlights the potential for wind turbine obstacles that could potentially impact the operations of the Emergency Aeromedical Service (EAS). A review of the EAS operational requirements will be required to inform the assessment of the potential impacts of the proposed wind farm development.


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Abbreviations

AGL	Above Ground Level
AMSL	Above Mean Sea Level
ARP	Airport Reference Point
DoD	Department of Defence
EAS	Emergency Aeromedical Service
GP	Glide Path
HLS	Helicopter Landing Site
IAC	Irish Air Corps
ICAO	International Civil Aviation Organization
IFP	Instrument Flight Procedure
ILS	Instrument Landing System
OLS	Obstacle Limitation Surface
PSR	Primary Surveillance Radar
RWY	Runway
SID	Standard Instrument Departure Route
STAR	Standard Arrival Route
SSR	Secondary Surveillance Radar
NAS	National Ambulance Service
NM	Nautical Miles
DVOR	Doppler VHF Omni-directional Range Station

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1. Introduction

In this section a brief summary of the wind farm site is provided. Details regarding the site’s geographic location and the proposed wind turbine dimensions are presented.

1.1 Wind Farm Site Information

The proposed wind farm development is located approximately 9 km east of Thurles. The development is in the pre-planning stage and exact details regarding the quantity, location and turbine dimension have yet to be finalized. However, for the purpose of this study, an 11-turbine layout has been considered with the turbines dimensions as shown below in Table 1

Wind Farm	Number of Turbines	Turbine dimensions	
		Hub Height	Rotor Diameter
Littleton	11	119 m	162 m

Table 1. Littleton Wind Farm Turbine Details

The location of the proposed wind farm development is shown below in Figure 1.

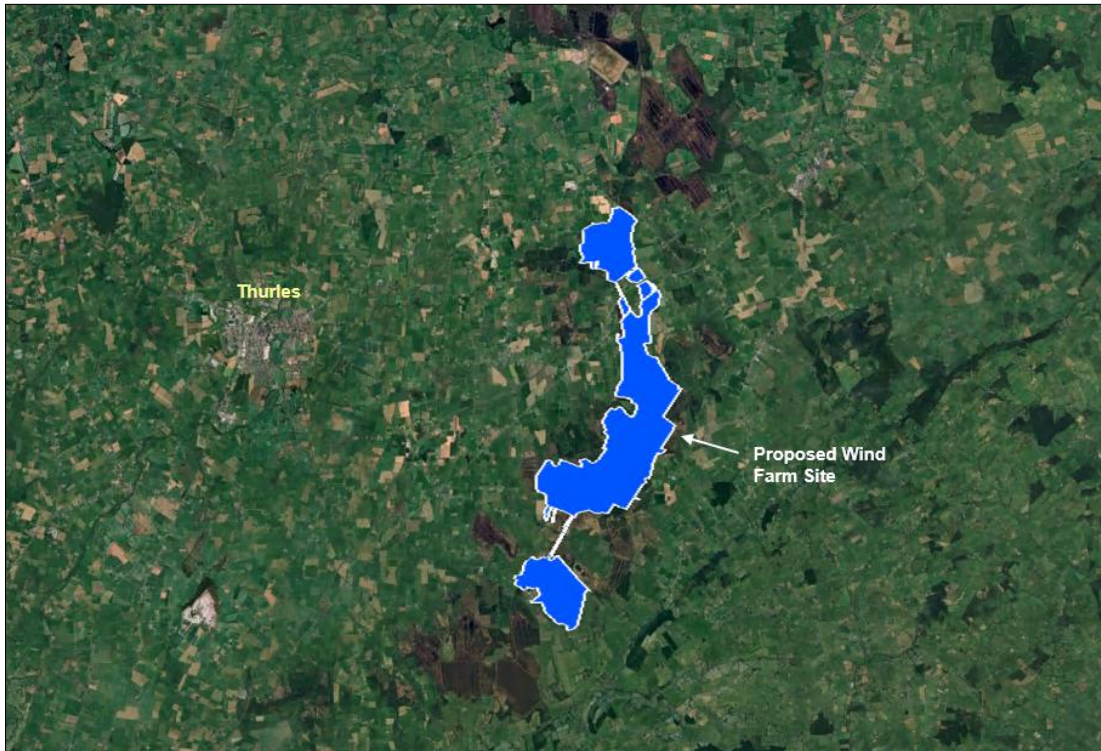



Figure 1. Location of proposed Wind Farm.

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2. Aviation Review

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

- Department of Defence (DoD) / Irish Air Corps (IAC) Safeguarding
- Emergency Aeromedical Service (EAS)

2.1 Department of Defence / Irish Air Corps Safeguarding

The standard concerns raised by the Department of Defence, relate to the potential impact of wind turbines on the aviation activities of the Irish Air Corps (IAC). The Department of Defence highlights IAC Restricted Areas (for wind farms/ tall structures). As a prescribed body the Department of Defence would submit a response with a request for specific Aeronautical Obstacle Warning Light Scheme to be put in place where wind turbines may have a potential impact.

An assessment of the IAC Restricted Areas is provided in Section 2.1.1, and a review of the IAC Aeronautical Obstacle Warning Light Scheme is provided in Section 2.1.2

2.1.1 Department of Defence – IAC Restricted Areas

The Irish Air Corps Position Paper “*Air Corps Wind Farm/ Tall Structures Position Paper*” published on 08th August 2014 (Appendix A), states that the Air Corps are likely to oppose any wind farm / tall structure in the following restricted areas:

- Lands underlying military airspace for flying activity. (Areas contained in Danger Areas EI-D1, EI-D5, EI-D6, EI-D13, EI-D14, Restricted Areas EI-R15, EI-R16 within 20 NM of Baldonnel, MOAs 3 and 4 within 20 NM of Baldonnel.
- Low Flying Training Areas within MOA 4 in the areas of; Blessington, Edenderry/Allenwood/Rathangan, Kilmeague/Newbridge.
- Low Flying Training Area West – LFTA WEST.
- A distance of 5 NM or less from military installations.
- Critical low level flying routes in support of Air Corps operation requirements, as described in Figure 2 below.

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c. The following routes are identified as critical low level routes in support of Air Corps operational requirements and the Air Corps is opposed to the erection of wind farms or tall structures within 3NM of the route centerline which could affect Air Corps' ability to access regional areas.

- (a) N/M1
- (b) N/M2
- (c) N/M3
- (d) N/M4
- (e) N/M6
- (f) N/M7
- (g) N/M8
- (h) N/M9
- (i) N/M11
- (j) N25
- (k) N17 between Sligo and Knock
- (l) N15/N13 between Sligo and Letterkenny
- (m) N14 from Lifford to Letterkenny and R245 and R247 from Letterkenny to Fanad Head.

Applications or proposals for structures in these areas of a height greater than 45m above ground level at the site of the object must be referred to Irish Air Corps for assessment of potential impact on flight operations.

Figure 2. Irish Air Corps – Critical Low-Level Routes

The nearest of the Air Corps restricted areas to the proposed wind farm is the low-level flight route around the M8 motorway. The proposed wind farm site is partially located within the restricted area (3NM) around the M8, as shown in Figure 3 below. As some of the proposed turbines at Littleton would be located inside the restricted area, the Irish Air Corps may raise concerns in relation to the proposed development.

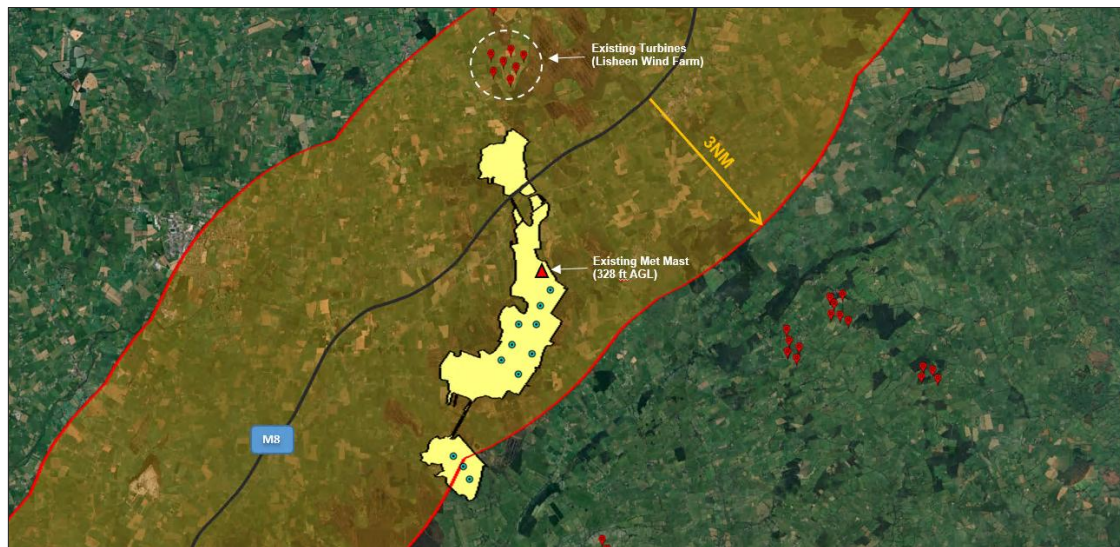



Figure 3. Proposed Wind Farm relative to IAC Critical Low Level Flight Route (M8)

Although the proposed wind farm is partially located within the restricted area around the M8, it should be noted that there are other existing wind farms that are located within 3NM of the M7 and M8 motorways (e.g., Monaincha, Lisheen II, Lisdowney and Kill Hill wind farms) as shown below in Figure 4. It should also be noted that there is an existing meteorological mast adjacent to the proposed turbines at Littleton which is marked on the IAA obstacle dataset with a published height of 328 ft AGL.

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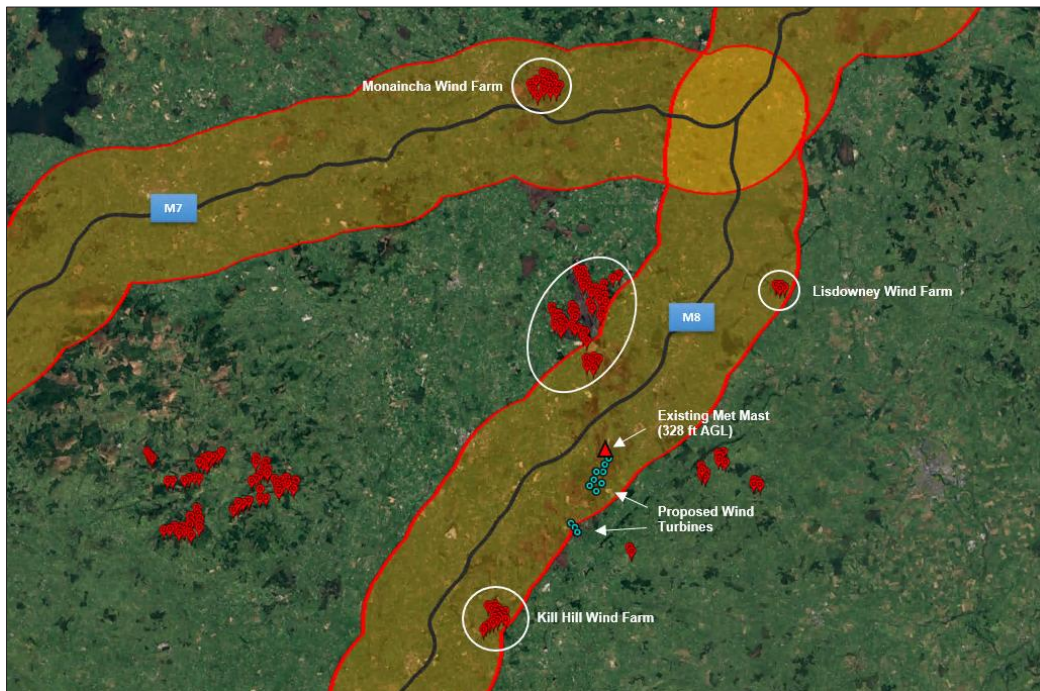



Figure 4. Existing Wind Farms located within 3NM of Low-Level Route Restricted Areas

A summary of points for consideration have been highlighted below, taking into account that the proposed wind farm development lies inside the restricted zone along the M8 motorway.

- The proposed wind farm site is not located under a direct flight path from Baldonnel to any of the regional airports (e.g. Kerry, Cork, Waterford) or major cities (e.g. Cork, Limerick, Waterford); however, this will be dependent on the operational requirements for the flight path route planned by the aircraft pilots.
- The area to the east of the M8 motorway where the proposed development is situated, is in close proximity of high terrain, as shown in Figure 5 and Figure 6. Figure 5 shows the topographical plan view while Figure 6 shows the cross-sectional view along Cross Section A1 – A2.
- In poor weather, low-level flights along the M8, in the vicinity of the proposed development would be within 7.5 km of this high terrain to the east of the motorway. The hills to the east of the motorway would also contribute to lower visibility and lower cloud base cover.
- In good weather conditions, the proposed wind farm could potentially be used as a visual landmark to aid Visual Flight Rules (VFR) navigation. There are existing wind farms in the area (e.g. Lisheen and Lisdowney) and any additional wind turbines could be used cumulatively by pilots as a visual marker to aid navigation.
- There is an MET Mast, 328ft AGL, adjacent to the proposed wind farm development that is promulgated in the IAA Air Navigation Obstacle Data Set.
- The existing wind farms at Kill Hills, Lisdowney and Lisheen II are marked as obstacles on existing aviation charts and would inform pilots (adhering to Rules of the Air). This would mean that these existing obstacles are known to pilots flying along the M8. In the event that planning consent is granted to the proposed development the wind

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turbines locations would be published and registered in the IAA Air Navigation Obstacle Data Set.

- All existing promulgated obstacles in the vicinity of the proposed development would need to be considered as part of the existing baseline assessment of hazards to aviation. The proposed development would need to inform any cumulative assessment with existing operational wind farms to ascertain whether there is an increased risk to low-level flying.
- Any reverse course manoeuvres would have to be subject to the operational requirements of each specific flight. This would have to take into consideration the existing operational wind farms at Kill Hills (to the south west), Lisdowney wind farm (to the north west) and the Lisheen wind farm (to the north).
- Where there is deteriorating visibility and/or reducing cloud base where a pilot is forced to undertake a reverse course manoeuvre in the vicinity of the proposed development, the turn radius for an aircraft would need to be considered and would be informed by the unique operational requirements of the pilot. A worst-case scenario, where the pilot decides to commence a reverse-course manoeuvre as they are flying south along the M8 adjacent to proposed would again depend on the unique operational requirements for the flight path required.
- The operational requirements of any flight plan along the M8, in the vicinity of the proposed development (and the existing operational wind farms) would take into consideration crosswinds and any **impacts due to the existing operational wind turbines.**
- All modern aircraft are equipped with a range of Global Navigation Satellite Systems (GNSS), e.g. GPS, GLNASS, Galileo, etc. These GNSS systems provide pilots with accurate navigation information including data to avoid obstacles during VFR operations. Should the proposed wind farm be permitted the turbine location would be submitted to the IAA and aviation charts and GNSS databases would be updated accordingly.

Two cross sections in the vicinity of the proposed wind farm were assessed;

- i) A1 – A2: Terrain Profile Perpendicular to the M8 Motorway
- ii) B1 – B2: Terrain Profile parallel to the M8 Motorway

The results of both cross sections (Figure 5) show the low-level flight airspace relative to the proposed wind farm site and the high terrain to the east of the motorway.

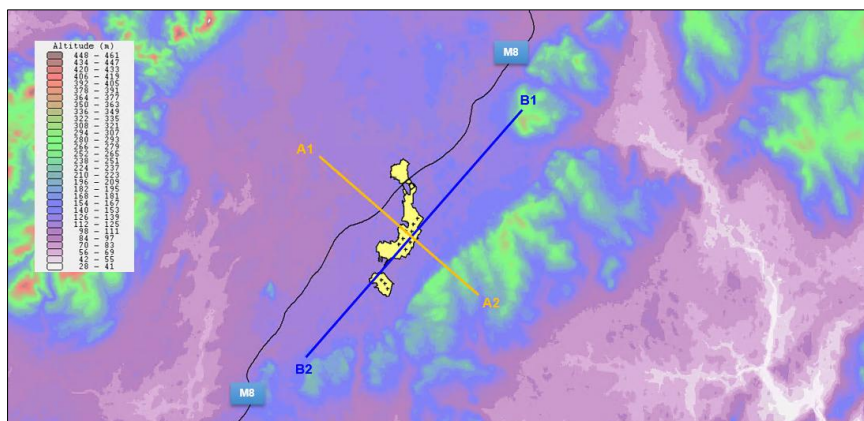



Figure 5. Littleton Wind Farm - Cross Section Analysis Map

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Cross Section A1-A2 is shown below in Figure 6 and shows the high terrain to the southeast of the M8 Motorway (Red Area). Any Low-level flights along the M8 Motorway (Green Area) would avoid the existing high terrain to the southeast (i.e. Bregaun Hill).

Cross Section B1-B2 is shown below in Figure 7 and shows the proposed development Terrain Profile parallel to the M8 Motorway. There is an existing range of hills, Spa Hills, which are at 265m AOD and all flight according to Rules of the Air would have to be a further 150m above this existing terrain. The proposed wind turbines, with a turbine tip height of 200m AGL would result in an obstacle of 325m AGL. This would be lower than the required flight altitude of 415m to clear the Spa Hills.

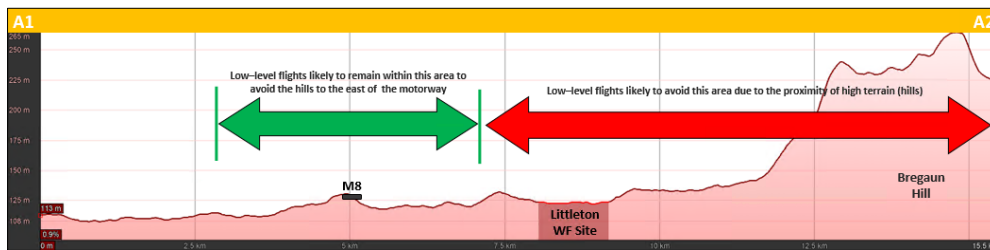


Figure 6. Cross Section A1-A2 (Terrain Profile Perpendicular to the M8 Motorway)

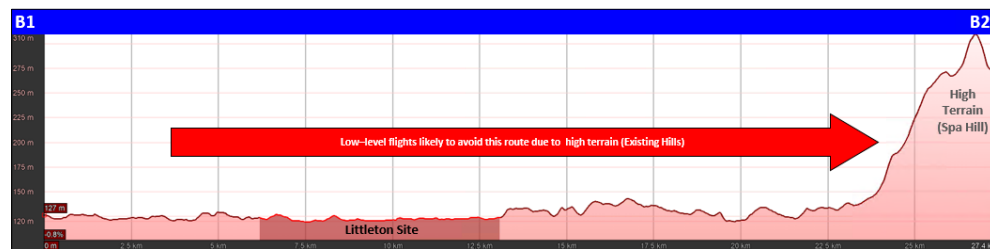


Figure 7. Cross Section B1-B2 (Terrain Profile Parallel to the M8 Motorway)

Aviation Impact Review	Mitigation Measures	Residual Impact
DoD - IAC Restricted Areas	Subject to pilot flight plan.	None


Table 2. Aviation Impact Review – IAC Restricted Areas

2.1.2 Aeronautical Obstacle Warning Light Scheme

To-date there has been no consultation response from the Department of Defence highlighting any requirements for an Aeronautical Obstacle Warning Light Scheme.

The Department of Defence (DoD) aviation lighting requirements are for illumination 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. There is an additional requirement that Obstacle lighting may be incandescent and if LED or other lighting types are used should be a type visible to Night Vision equipment. The DoD also require that 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. The developer of the proposed wind farm development would agree to implement an aviation lighting scheme.

Any requirements in relation to an Aeronautical Obstacle Warning Light Scheme would be taken into account and a suitable aviation lighting mitigation scheme would be presented for consideration by the Department of Defence Planning Department.

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Littleton Wind Farm – DoD-IAC Aviation Review Statement	Approved: KH	Date: 02/03/2026

2.2 Emergency Aeromedical Service (EAS)

The air ambulance service in Ireland is known as the Emergency Aeromedical Service (EAS). The EAS crew (which include National Ambulance Service (NAS) paramedics) deal with time-critical emergency callouts to major emergencies such as road collisions and urgent medical events. The EAS currently operate two air ambulance helicopters operating from two bases:

- Custume Barracks, Athlone, Co Westmeath. (Operated by IAC)
- Rathcoole Aerodrome, Rathcoole, Mallow, Co Cork. (Operated by Private Company (Gulf Med Aviation Services))

The helicopter borne emergency air ambulances consist of

- an Air Corps operated aircraft (AgustaWestland AW139) based at Custume Barracks in Athlone.
- a commercially operated aircraft (Airbus H135) located at Rathcoole Aerodrome in North County Cork.

The nearest EAS base to the proposed wind farm is the base in Athlone. The flight times from the EAS base at Athlone are shown in Figure 8.


The proposed development would not have any impact on take-off or approach procedures into either of the bases.

In the event of planning consent being granted, the turbine locations would be submitted to the IAA and aviation charts and GNSS databases would be updated accordingly. EAS helicopters would also be fitted with GNSS systems which would clearly identify any potential objects in the operational area (e.g. wind turbines).

The proposed wind farm site is located in an area that is sparsely populated, in boggy terrain and is unlikely to be used for a pickup location as there is no public access to this area.

The footprint of the proposed wind farm development is small and any flight diversions of EAS operations within the vicinity would not have an impact as consented turbines would have to be fitted with aeronautical lighting.

Based on the reasons outlined above the proposed wind farm development should have no impact on EAS operations.

	Procedure: 001	Rev: 4.0
Littleton Wind Farm – DoD-IAC Aviation Review Statement	Approved: KH	Date: 02/03/2026

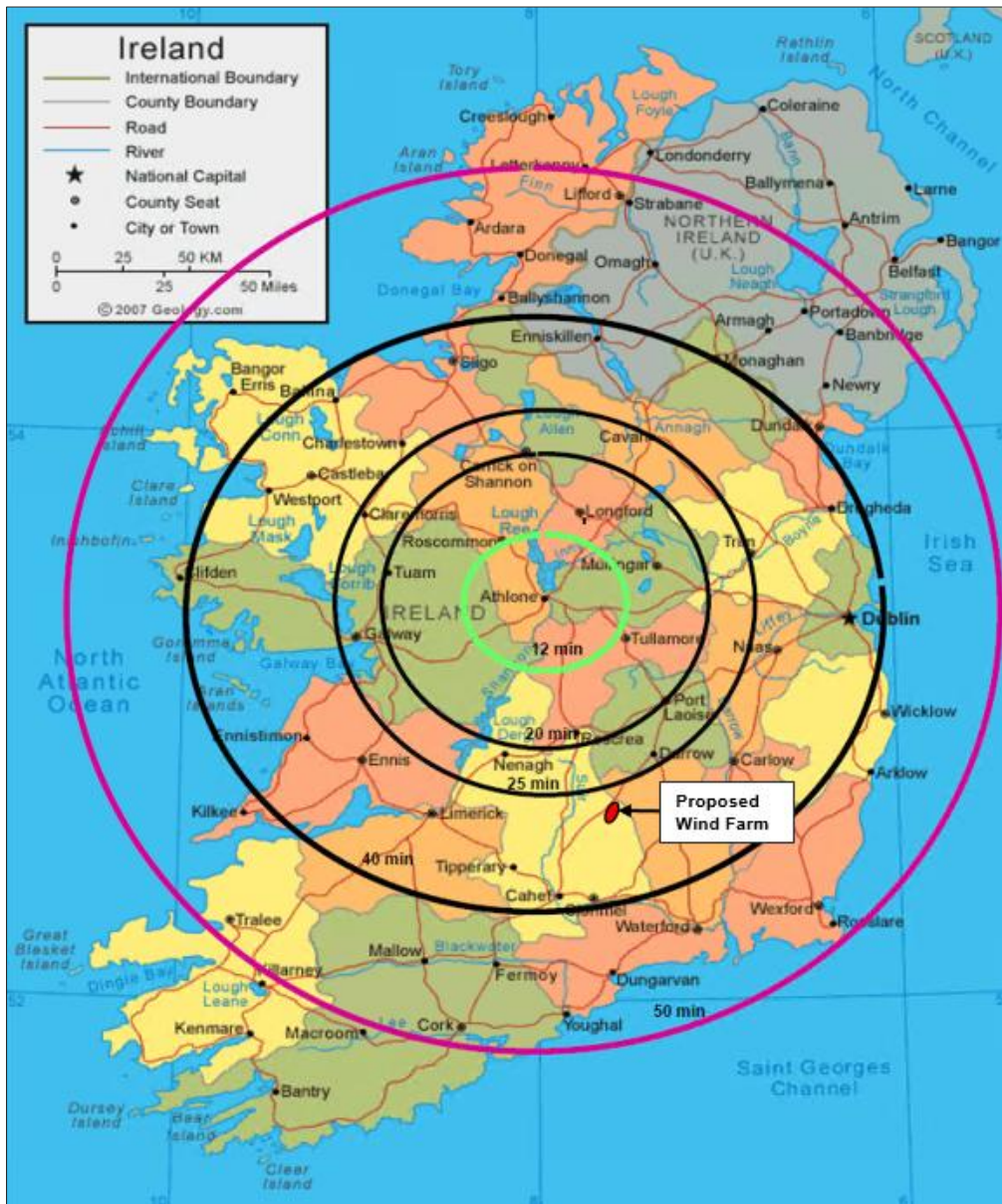


Figure 8. EAS – Flying Times from Athlone

EAS Aircraft	Impact of proposed wind farm – Opinion
Helicopter (AgustaWestland AW139 / Airbus H135)	<p>Low – Helicopter landings at the subject area are highly unlikely to occur as the proposed wind farm site is in an area that is sparsely populated and is located on boggy terrain.</p> <p>In addition, the aircraft would be equipped with modern communications systems and navigational equipment. Should the wind farm be permitted, the turbines would be fitted with aeronautical lighting and would be clearly marked in aviation charts.</p>

Table 3. Impact of proposed wind farm on EAS Operations

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Littleton Wind Farm – DoD-IAC Aviation Review Statement	Approved: KH	Date: 02/03/2026

3. Summary


A summary of the Department of Defence / Irish Air Corps aviation review for the proposed wind farm at Littleton is provided in Table 4 below.

Item	Impact	Summary
DoD / IAC Safeguarding	Observation	<p>The proposed wind farm is partially located within the low-flying restricted area along the M8 motorway (i.e. IAC low-level flight route), and the Irish Air Corps may raise concerns in relation to the proposed wind farm development.</p> <p>Summary points have been provided for consideration for the Department of Defence and the Irish Air Corps. A description of the existing operational wind farm obstacles and terrain obstacle environment has been provided. This includes the Bregaun Hills, 7km to the southeast, of the motorway and the Spa Hills, 15km to the north-east, of the proposed development. This additional information has been presented for consideration.</p>
Aeronautical Obstacle Warning Light Scheme	Observation	<p>The Department of Defence (DoD) aviation lighting requirements are for illumination 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. there is an additional requirement that Obstacle lighting may be incandescent and if LED or other lighting types are used should be a type visible to Night Vision equipment. The DoD also require that 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. The developer of the proposed wind farm development would agree to implement an aviation lighting scheme.</p>
Emergency Aeromedical Service (EAS)	None	<p>A review of EAS operations indicates that they are unlikely to be impacted by the proposed wind farm development.</p>

Table 4. Littleton Wind Farm – DoD / IAC Aviation Review Summary

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Littleton Wind Farm – DoD-IAC Aviation Review Statement	Approved: KH	Date: 02/03/2026


APPENDIX A – Air Corps Wind Farm / Tall Structures Position Paper, August 2014



**Óglaigh
na hÉireann**
DEFENCE FORCES IRELAND

Ceanncheatru an Aer Chor
Air Corps Headquarters


08 August 14

GOC AC 

Air Corps Wind Farm/Tall Structures Position Paper

Sir,

1. The attached is the draft Air Corps Position Paper agreed and developed in concert with the flying units under the auspices of CAS Ops.
2. It is recommended that it be forwarded to the Directorate of Operations for transmission to the Department of Defence.
3. The AC position contained within this paper should be notified to planning authorities including An Bord Pleanála. It should also be forwarded to the Department of the Environment, Heritage and Local Government to inform its policies and guidance in respect of wind farms.



Raymond Martin, Lt Col
CATSO

CATSO, Ceanncheatru an Aer Chor, Aerodrom Mhic Easmuinn, BAC 22.
 CATSO Air Corps Headquarters, Casement Aerodrome, Baldonnel, Dublin 22
 Ph +353 (0)1 403 7513 Fax: +353 (0)1 403 7850

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Littleton Wind Farm – DoD-IAC Aviation Review Statement	Approved: KH	Date: 02/03/2026



Ceanncheatru an Aer Chor
Air Corps Headquarters

Air Corps Wind farm/Tall Structures Position Paper.

1. Objective:

This position paper is intended to ensure that

- a. Air Corps operations and training may be accomplished in a safe and economical manner;
- b. Baldonnel remains a viable aerodrome for IFR and VFR traffic;
- c. The ability to train military flying skills is protected;
- d. Vital navigation routes to and from the regions to Baldonnel and the Dublin area are protected to safeguard the ability of the Air Corps to fulfill its role.

2. Statement of position.


- a. The Air Corps is opposed the erection of wind farms or other obstacles which will affect its ability to train and operate in a safe and economic manner.
- b. The Air Corps is opposed to any wind farms or tall structures in the following areas:

(1) Lands underlying military airspace used for flying activity

- (a) The area contained in Danger Area EI-D1.
- (b) The area contained in Danger Area EI-D5.
- (c) The area contained within Danger Area EI-D6.
- (d) The area contained within Danger Area EI-D13.
- (e) The area contained within Danger Area EI-D14.
- (f) The area contained within Restricted Area EI-R15.
- (g) The area contained within Restricted Area EI-R16 within 20NM of Baldonnel.
- (h) The area contained within Military Operating Areas, MOAs 3 and 4 within 20NM of Baldonnel.

(2) Areas wherein military flying occurs at low level as identified in the annexes listed below.

- (a) Annex A: Low flying training areas within MOA 4 in the areas of
 - a. Blessington
 - b. Edenderry/Allenwood/Rathangan
 - c. Kilmeague/Newbridge
- (b) Annex B: low flying training area West (LFTA WEST).

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Littleton Wind Farm – DoD-IAC Aviation Review Statement	Approved: KH	Date: 02/03/2026

(3) A distance of 5NM or less from military installations.

c. The following routes are identified as critical low level routes in support of Air Corps operational requirements and the Air Corps is opposed to the erection of wind farms or tall structures within 3NM of the route centerline which could affect Air Corps' ability to access regional areas.


- (a) N/M1
- (b) N/M2
- (c) N/M3
- (d) N/M4
- (e) N/M6
- (f) N/M7
- (g) N/M8
- (h) N/M9
- (i) N/M11
- (j) N25
- (k) N17 between Sligo and Knock
- (l) N15/N13 between Sligo and Letterkenny
- (m) N14 from Lifford to Letterkenny and R245 and R247 from Letterkenny to Fanad Head.

Applications or proposals for structures in these areas of a height greater than 45m above ground level at the site of the object must be referred to Irish Air Corps for assessment of potential impact on flight operations.

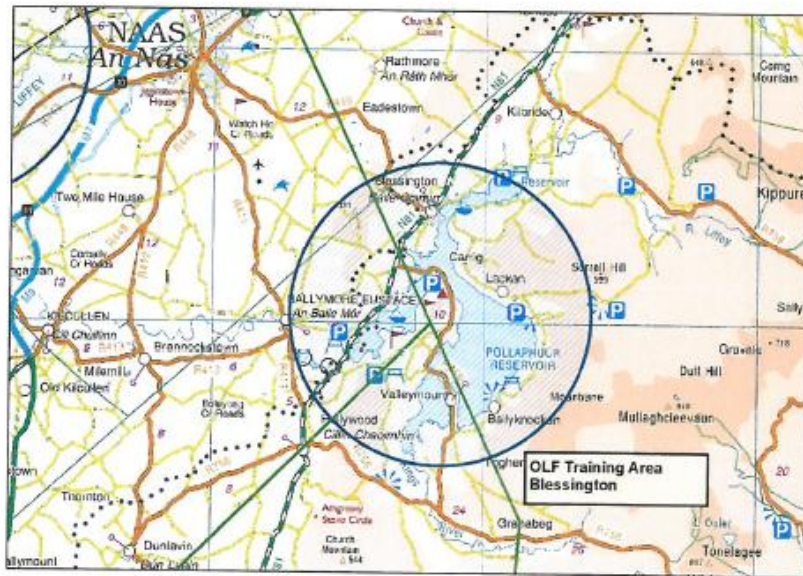
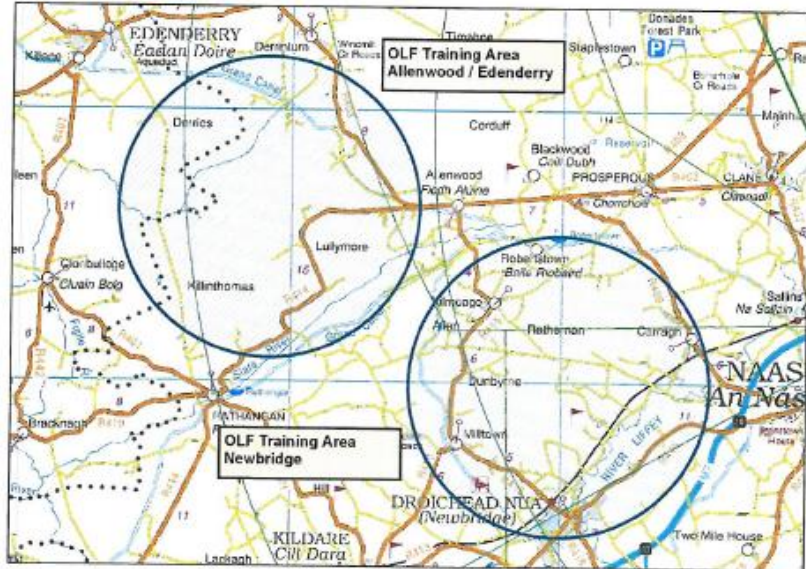
d. In MOA 4 outside of the areas identified in b.(1) (2) and (3), and in MOA 5, applications or proposals for objects of a height greater than 45m above ground level at the site of the object must be referred to the Irish Air Corps for assessment of potential impact on flight operations.


e. In all locations where wind farms or masts are permitted it should be a condition that they meet the following lighting requirements

- (1) Single turbines or structures, or turbines delineating corners of a wind farm, should be illuminated by high intensity strobe lights (Red).
- (2) Obstruction lighting elsewhere in a wind farm will be of a pattern that will allow the hazard be identified and avoided by aircraft in flight.
- (3) Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment. Obstruction lighting fitted to obstacles must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum, specifically at or near 850nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.

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Annex A
Low Flying Areas - MOA 4




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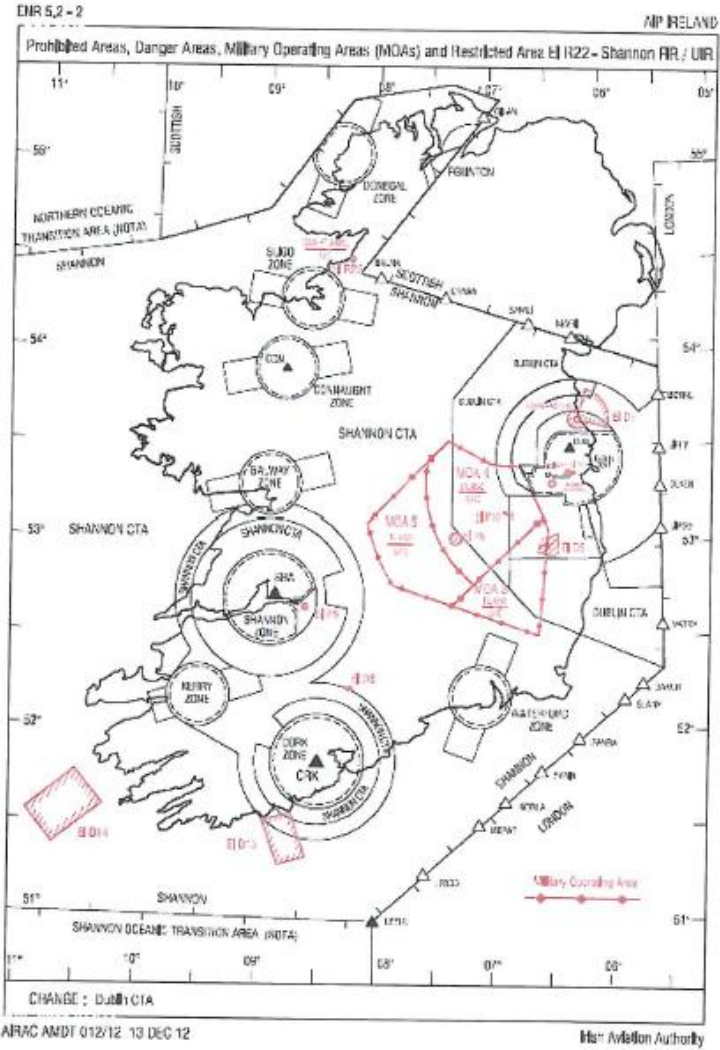
Annex B


Low Flying Area – LFTA WEST

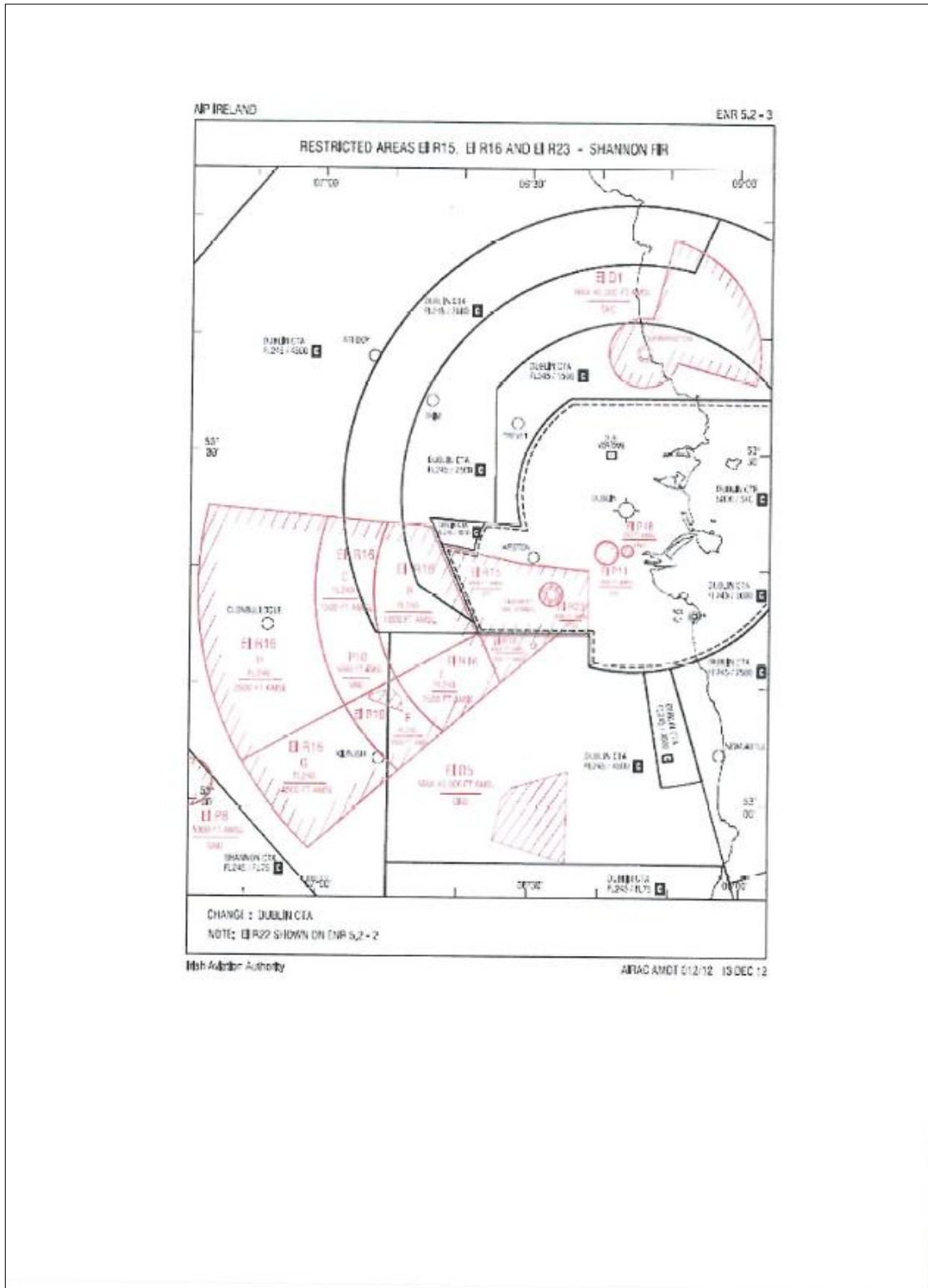
1. Area contained within the following grid L6972; L6945; M0745; M0772
2. Routes are primarily within valley areas.
3. Applications for wind farms/masts should be referred to Air Corps Operations for assessment against low flying routes.


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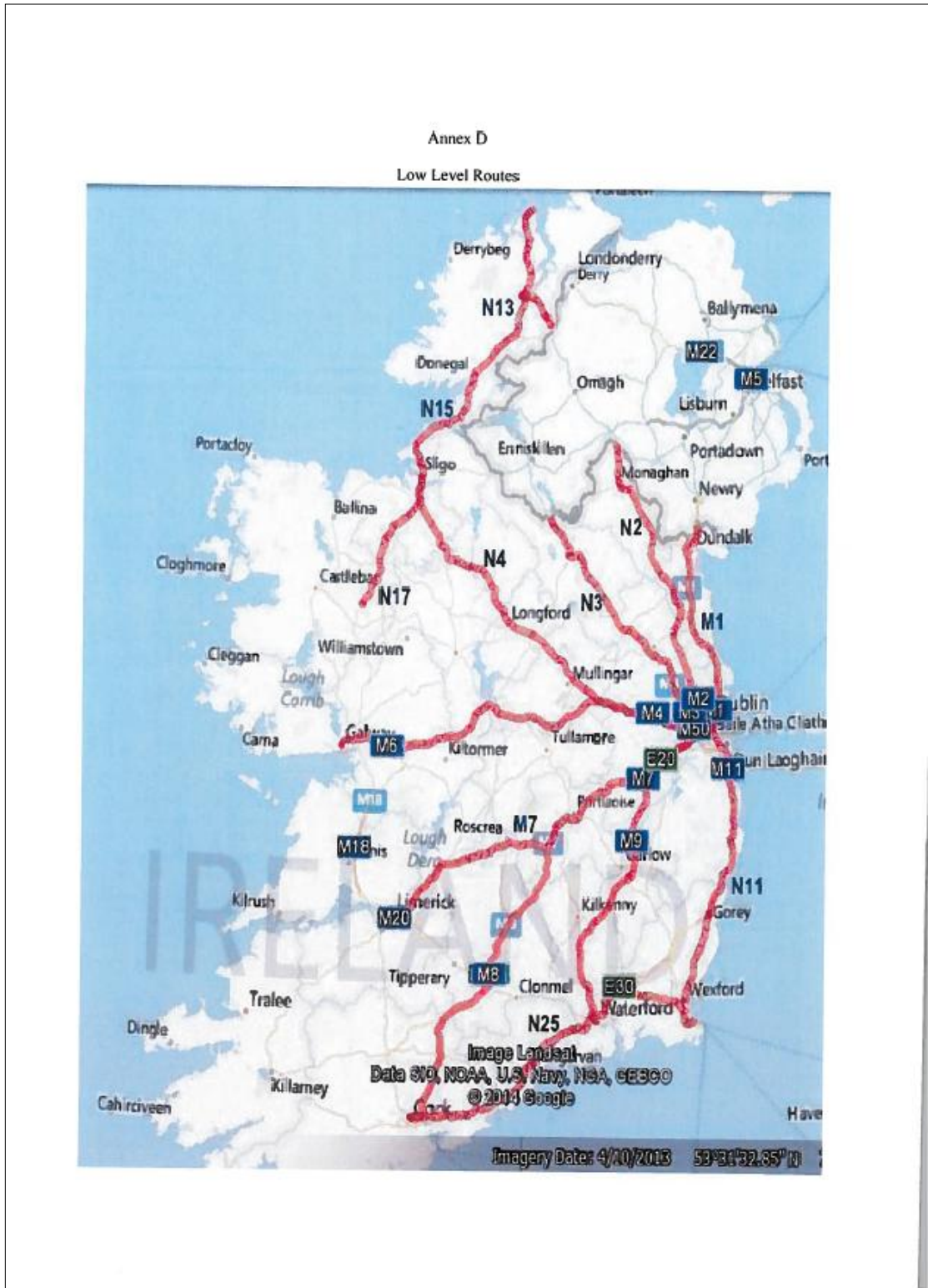
Annex C
Designated Airspace
Restricted Areas, Danger Areas and Military Operating Areas



	Procedure: 001	Rev: 4.0
Littleton Wind Farm – DoD-IAC Aviation Review Statement	Approved: KH	Date: 02/03/2026




	Procedure: 001	Rev: 4.0
Littleton Wind Farm – DoD-IAC Aviation Review Statement	Approved: KH	Date: 02/03/2026




APPENDIX 15.4

Aviation Consultations

 <i>Total Communications Solutions</i>	Procedure: 001	Rev: 1.0
Littleton Wind Farm Aviation Consultations – Appendix 15.4	Approved: KH	Date: 19/02/26

APPENDIX 15.4

Littleton Wind Farm Aviation Consultations

	Procedure: 001	Rev: 1.0
Littleton Wind Farm Aviation Consultations – Appendix 15.4	Approved: KH	Date: 19/02/26


Appendix 15.4– Aviation Consultations

The Aviation Consultations undertaken by the Developer / EIAR Consultants (Fehily Timoney and Company) between September 2021 and December 2025 are provided below.

September 2021

From:	IAA INFORMATION <iaainfo@IAA.ie>
Sent:	Friday 17 September 2021 09:12
To:	Littleton Wind farm
Subject:	Automatic reply: P20-211 - Littleton Wind Farm EIAR and Planning Services
Follow Up Flag:	Follow up
Flag Status:	Flagged
<p>Thank you for contacting the Irish Aviation Authority. Your email will be responded to within ten working days.</p> <p>If your query is in relation to a licence please email licensing@iaa.ie</p> <p>Kind regards, Irish Aviation Authority</p>	

From:	O'LEARY Geraldine <Geraldine.O'LEARY@IAA.ie>
Sent:	Thursday 30 September 2021 13:36
To:	Littleton Wind farm
Subject:	FAO: EAMONN HUTTON - REF: P21-211/LETT/EH/MG
Follow Up Flag:	Follow up
Flag Status:	Flagged
<p>Reference: P21-211/Lett/EH/MG</p> <p>Re: Proposed Littleton Wind Farm Environmental Impact Assessment Report – EIAR Scoping and Consultation Request.</p> <p>Dear Mr. Hutton,</p> <p>Thank you for your letter/scoping report and request for comments in relation to the proposed windfarm to be located approximately 3km east of the village of Littleton and 10km east of Thurles, Co. Tipperary.</p> <p>As the number of proposed turbines, the blade tip height and elevations of each turbine and the layout is not provided, Safety Regulation Division - Aerodromes cannot make any specific comments at this time.</p> <p>The development appears to be approximately 22kms West of Kilkenny Airport, as such, it is likely that the following general observations would be proffered 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.</p> <p>Yours sincerely,</p> <p>Deirdre Forrest Corporate Affairs</p>	

	Procedure: 001	Rev: 1.0
Littleton Wind Farm Aviation Consultations – Appendix 15.4	Approved: KH	Date: 19/02/26

From: O'LEARY Geraldine <Geraldine.O'LEARY@IAA.ie>
Sent: Thursday 30 September 2021 13:36
To: Littleton Wind farm
Subject: FAO: EAMONN HUTTON - REF: P21-211/LETT/EH/MG

Follow Up Flag: Follow up
Flag Status: Flagged

Reference: P21-211/Lett/EH/MG

Re: Proposed Littleton Wind Farm Environmental Impact Assessment Report – EIAR Scoping and Consultation Request.

Dear Mr. Hutton,

Thank you for your letter/scoping report and request for comments in relation to the proposed windfarm to be located approximately 3km east of the village of Littleton and 10km east of Thurles, Co. Tipperary.

As the number of proposed turbines, the blade tip height and elevations of each turbine and the layout is not provided, Safety Regulation Division - Aerodromes cannot make any specific comments at this time.

The development appears to be approximately 22kms West of Kilkenny Airport, as such, it is likely that the following general observations would be proffered 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,

Deirdre Forrest
Corporate Affairs

AiBridges <small>Total Communications Solutions</small>	Procedure: 001	Rev: 1.0
Littleton Wind Farm Aviation Consultations – Appendix 15.4	Approved: KH	Date: 19/02/26

November 2023

From: Sinead Lynch
Sent: Thursday 16 November 2023 10:06
To: info@iaa.ie
Cc: Trevor Byrne; Littleton Wind farm
Subject: Proposed Littleton Wind Farm Environmental Impact Assessment Report - Aviation
Attachments: Turbine Layout.kml; Met Mast Location.kml

Dear Sir/Madam,

My colleagues previously contacted IAA in 2021 regarding a proposed wind farm development at Littleton Bog, County Tipperary. See email thread below for previous correspondence. Since that initial email, the wind turbine layout design has been finalised. Details of the proposed project layout are outlined below.

The proposed wind farm project consists of 11 no. wind turbines with a blade tip height of 190 m, a hub height of 108 m and a rotor diameter of 164 m. 1 no. permanent meteorological mast to a height of 100 m above ground level.


The turbine and met mast location coordinates (ITM) are shown in the table below and I have attached a KMZ file of these locations which can be viewed in google earth.

Turbine ID	ITM Coordinates (X)	ITM Coordinates (Y)
T1	624121	657241
T2	623554	656586
T8	623067	654422
T7	622484	655013
T3	624059	655927
T4	622863	655965
T5	623227	655459
T10	621249	651425
T6	623561	654979
T9	620913	651814
T11	621584	651035
Met Mast	621775	654525

I would appreciate it if you would review the turbine locations and notify us if there are any foreseeable impacts in relation to aviation or if you have any additional comments.

If you have any further queries or require any additional information please do not hesitate to contact me.

Kind regards,
 Sinéad

	Procedure: 001	Rev: 1.0
Littleton Wind Farm Aviation Consultations – Appendix 15.4	Approved: KH	Date: 19/02/26

May 2025

From: IAA INFORMATION <iaainfo@IAA.ie>
Sent: Thursday 8 May 2025 13:30
To: Littleton Wind farm
Subject: Automatic reply: Proposed Littleton Wind Farm Environmental Impact Assessment Report

You don't often get email from iaainfo@iaa.ie. [Learn why this is important](#)

Thank you for contacting the Irish Aviation Authority.
Your Email has passed to the relevant section.

For further information on how to contact us, please visit our website :
<https://scanner.topsec.com/?d=2349&r=show&u=https%3A%2F%2Fwww.iaa.ie%2Fcontactus&t=7b955fc138085d863d8c441631ecafd4c4b6f526>

Kind regards,
Irish Aviation Authority

From: David MCCANN <David.McCann@IAA.ie>
Sent: Monday 12 May 2025 11:50
To: Littleton Wind farm
Cc: Planning; IAA INFORMATION
Subject: RE: Proposed Littleton Wind Farm Environmental Impact Assessment Report

You don't often get email from david.mccann@iaa.ie. [Learn why this is important](#)

Dear Niamh,

Thank you for your request for consultation in relation to the proposed wind farm containing eleven (11) wind turbines (max tip height of 200m) to be located at Littleton, East County Tipperary.

The IAA recommends that the developer engage directly with the Property Management Branch of the Department of Defence and Air Navigation Service Provider Air Nav Ireland to make them aware of the proposal and ensure appropriate screening from an aviation safety perspective.
Email address for Air Nav Ireland is as follows: planning@airnav.ie

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 in accordance with S.I. 215 of 2005 Irish Aviation Authority (Obstacles to Aircraft In Flight) Order.

If you have any further queries, please email planning@iaa.ie

Kind regards,
Dave

From: IAA INFORMATION <iaainfo@IAA.ie>
Sent: Thursday, May 8, 2025 1:53 PM
To: Planning <planning@iaa.ie>
Subject: FW: Proposed Littleton Wind Farm Environmental Impact Assessment Report


From: Littleton Wind farm <littletonwindfarm@ftco.ie>
Sent: Thursday 8 May 2025 13:28
Subject: Proposed Littleton Wind Farm Environmental Impact Assessment Report

*** This message originated from outside the Irish Aviation Authority. Please treat hyperlinks, attachments and instructions in this email with caution. ***

Dear Sir/Madam,

We are writing to you on behalf of our client, Littleton Wind Farm DAC, to request your feedback relating to the Proposed Littleton Wind Farm as part of the technical consultation process for the project's Environmental Impact Assessment Report (EIAR).

1

 <small>Total Communications Solutions</small>	Procedure: 001	Rev: 1.0
Littleton Wind Farm Aviation Consultations – Appendix 15.4	Approved: KH	Date: 19/02/26

We are writing to all consultees again through this scoping update letter to invite you to comment on any additional technical issues that you feel should be considered in this EIAR, which will be prepared as part of the Proposed Littleton Wind Farm planning application process.

Littleton Wind Farm DAC intend to apply for planning permission for a renewable energy development referred to as the Littleton Wind Farm, located in East County Tipperary, approximately 3km east of the village of Littleton and 10km east of Thurles. The proposed development is located on a bog group consisting of the Longford Pass, Littleton and Lanespark Bogs.

It is intended to make a planning application directly to An Bord Pleanála under the Strategic Infrastructure Act 2006 (as amended)

This email and attached scoping report is being issued to you as part of the consultation process for the project's Environmental Impact Assessment Report (EIAR). As part of the consultation process, we would be interested in receiving any comments you may have on the proposed development, relevant to your area of expertise. We respectfully ask that you forward all responses before the Friday the 25th of April 2025 to provide adequate time to consider all material. Your response may be forwarded by email or by post to the address below.

By Email: littletonwindfarm@ftco.ie

By Post: Littleton Wind Farm, Fehily Timoney & Company, Core House, Pouladuff Road, County Cork, T12 D773

If you have no comments to make on the proposed project, I would be grateful if you would please acknowledge receipt of this correspondence. If you have any further queries regarding the project, please contact the undersigned.

Kind regards,


Niamh



Niamh Curtin
Administrator

Fehily Timoney and Company
Core House, Pouladuff Road, Cork, T12 D773
t: +353 21 496 9585

www.fehilytimoney.ie  

 Total Communications Solutions	Procedure: 001	Rev: 1.0
Littleton Wind Farm Aviation Consultations – Appendix 15.4	Approved: KH	Date: 19/02/26

December 2025

SSE-BnM Wind Farms - Follow-up Meetings

Cunniffe, Sean
 To: Defence Property Management Planning
 Cc: Burke, Laura; Stephen Nolan; Kerins, Emma
 Retention Policy: SSE - Staff - 8 Years Delete Policy For All - 2 (8 years) Expires: 14/12/2033

Publ
 If there are problems with how this message is displayed, click here to view it in a web browser.

SSE-BnM JV meeting follow-up.eml
 537 KB

Good afternoon Phil,

Hope you're keeping well. Following our last meeting on July 23rd, I'm just flagging that I'll be sending two requests today for project-specific virtual meetings in January to discuss our upcoming applications for Loughglan and Littleton wind farms respectively.

We are intending to submit the applications to An Coimisiún Pleanála in Q1 2026. In the spirit of the new RED III planning regulations, which focus on robust pre-application engagement with stakeholders, we would appreciate further discussion as soon as can be facilitated - in particular on mitigations and the requirement of the DoD / Air Corps for an IAC Aeronautical Obstacle Warning Light Scheme notwithstanding the IAA requirements.

To inform the discussions, we sent over (on 15-08-25 - attached, re-sent 08-09-25): a table of the proposed wind farm sites with requested site-specific data; a KMZ file and shapefile of all the Project 30 turbines; and an Excel table with the turbine numbers and coordinates in WGS84. Please let me know if you require any additional information to inform the DoD feedback on the sites.

Kind regards,
 Sean

Littleton Wind Farm meeting request

Cunniffe, Sean <Sean.Cunniffe@sse.com>
 To: Defence Property Management Planning
 Cc: Burke, Laura; Donnelly, Caroline; Muriel Ennis
 If there are problems with how this message is displayed, click here to view it in a web browser.

Good afternoon Phil,


Would it be possible to provide some potential dates for a virtual meeting to discuss the aviation impacts of the proposed Littleton Wind Farm (to be delivered as part of the SSE-BnM Joint Venture)?

The context of the proposed site is provided below:

Site	Area opposed by the Air Corps	DoD critical Low-Level route (3NM road buffer)	DoD Notification Area	DDD Low Flying Area MLFA Athy	Aviation Issues	Affected MW	Maximum tip height	Average Site Reduced Level (AOD)	Maximum Tip Height Reduced Level Feet (AOD)	Planning submission date	Construction start date	Operational start date	Turbine rotor diameter - ranges considered (m)	Status of statutory scoping
Littleton	Partially	Yes	No	No	ALL Turbines are within DDD buffer for Critical Low-Level Routes (M8 Motorway). Site adjacent to area opposed by Air Corps.	79.20	200m, (656ft)	123m (403ft)	1059ft	Q1 2026	Q4 2028	Q2 2030	162-172	Statutory scoping issued 2021 and re-issued in 2025 by Fehily Timoney & Company

The Proposed Wind Farm Project is located in Co. Tipperary. The town of Thurles is located approximately 9km to the west of the Site. A KMZ file and shapefile of all the Project 30 turbines was sent to the DoD on in August 25 - please let me know if any further assistance is required in terms of accessing or interpreting the relevant spatial data.

Many thanks,
 Sean

	Procedure: 001	Rev: 1.0
Littleton Wind Farm Aviation Consultations – Appendix 15.4	Approved: KH	Date: 19/02/26

From: Conor Auld
Sent: Thursday 11 December 2025 11:58
To: planning@airnav.ie
Cc: Trevor Byrne <trevor.byrne@ftco.ie>; Anthony Ryan <anthony.ryan@ftco.ie>
Subject: Proposed Littleton Wind Farm EIAR

Dear Sir, Madam,

We are writing to you on behalf of our client, Littleton Wind Farm DAC, to request your feedback relating to the Proposed Littleton Wind Farm. Following EIA Scoping with the IAA it was suggested that we contact Air Nav Ireland regarding a proposed 11 turbine wind farm in County Tipperary to make you aware of the proposal and ensure appropriate screening from an aviation safety perspective.

The following are the proposed turbine specifications:

- blade tip height of 200 m,
- hub height of 119 m, and
- a rotor diameter of 162 m.

WTG ID	ITM Easting	ITM Northing
T01	624044	657148
T02	623721	656639
T03	623595	656033
T04	623023	656034
T05	622809	655374
T06	623461	655081
T07	622465	654873
T08	623020	654421
T09	620928	651759
T10	621249	651425
T11	621455	651016

Attached are shapfiles of the turbine locations, site boundary and met mast location.

It is our client's intention to submit this application to An Coimisiún Pleanála in early March 2026. Please do not hesitate to contact us at if you have further queries. We would welcome the opportunity to meet to present the proposed development in more detail (in January 2026 at the latest) ahead of finalising the EIAR.

Kind regards,



Conor Auld
Principal Planner
 Unit 3/4, Northwood House, Northwood Crescent, Northwood, Dublin, D09 X899
 T: +353 (0)1 658 3500
fehilytimoney.ie

