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Report

Ballincor Wind Farm Telecommunications Impact Study

Document Number:

Author: DMG.

Approved for Release: Rev 9.0 KH **Date:** 11/03/26

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

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Executive Summary

Ai Bridges was commissioned to evaluate the possible impacts that the proposed wind farm at Ballincor, Co Offaly, could have on 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.

During the consultation process, nineteen telecom operators were contacted. At the time of writing this report, seventeen of these operators have responded to the consultation requests. The responses received from each of the telecom operators can be found in Section 3 of this report.

Using the information obtained during the field survey assessments and consultation process a desktop impact analysis was carried out and all of the telecommunication operator networks were analysed using radio planning \ modelling software. Results from the impact analysis indicate that there are four licensed PTP radio links in the vicinity of the proposed development (Ref Table 1).

The findings of the network analysis indicate that one of the radio links would be impacted by the proposed turbine layout. The link that would be impacted is the Eir radio link between Knockshe and Coolderry, which would be impacted by Turbine T11.

In the case where the proposed wind farm is consented, it is recommended that the mitigation measure strategy as set out in Section 7 of this report, should be effected to offset the likely impact of T11 on the Eir radio link between Knockshe and Coolderry.

Telecom Operator	Link ID	Link Description	Observations	Mitigation Measures (Post-Consent)
Eir	Eir_L1	PTP radio link between Knockshe and Ballyegan	No impacts.	N.A.
Eir	Eir_L2	PTP radio link between Knockshe and Coolderry	Interference Impact (Radio Link Fresnel Zone obstructed by T11)	<p>Option 1: Relay via an Existing Eir Mast-site.</p> <p>Option 2: Relay Mast located within proposed wind farm site.</p> <p>Option 3: Re-route via an Alternative Eir Mast-site.</p>
Enet	Enet_L1	PTP radio link between VDF Nealstown and Carrig N.S.	No impacts.	N.A.
Three Ireland	3IRL_L1	PTP radio link between Birr and Knockshe	No Impacts	N.A.

Table 1. Licensed microwave radio in the vicinity of the proposed development.

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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 wind farm development is located approximately 5 km south of Birr in County Offaly. The development is in the pre-planning stage and turbine dimensions are yet to be finalised. However, three turbine manufacturer / models have been proposed. The dimensions associated with each turbine model are shown below in Table 2. The coordinates of the proposed turbine layout assessed in this report are provided in Appendix A.

Wind Farm ID	Number of Turbines	Turbine Model	Tip Height (m)	Hub Height (m)	Rotor Diameter (m)
Ballincor	11	Vestas V150	180	105	150
		Nordex N149	179.5	105	149
		Nordex N163	180	98.5	163

Table 2. Ballincor Wind Farm – Proposed Turbine Details

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



Figure 1. Location of proposed wind farm development.

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Section 2 - Methodology

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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 Irish National Grid (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 Ballincor. Figure 2 below shows the proposed wind turbines plotted in the radio planning tool.

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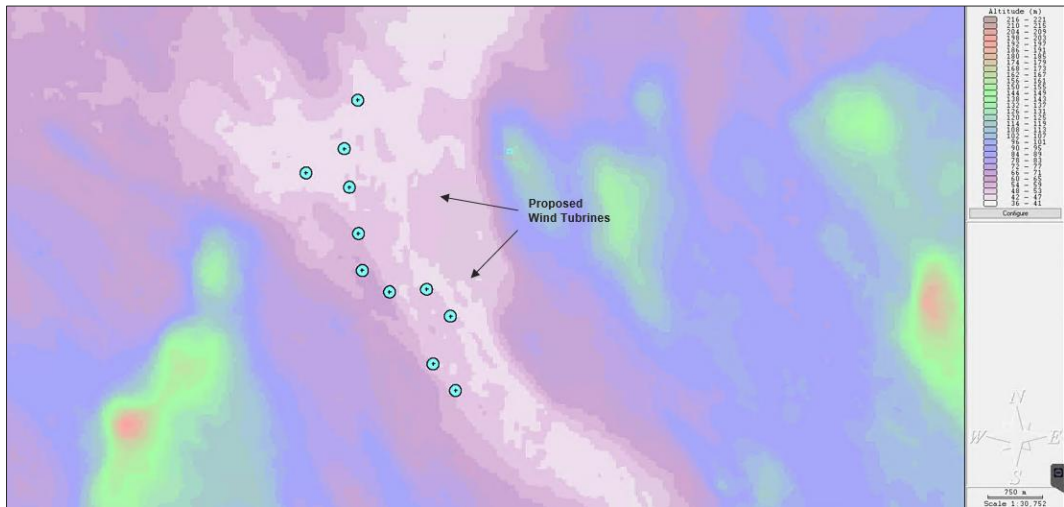


Figure 2. Wind Turbines plotted in Radio Planning Software

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 through the proposed wind farm site modelled in radio planning software.

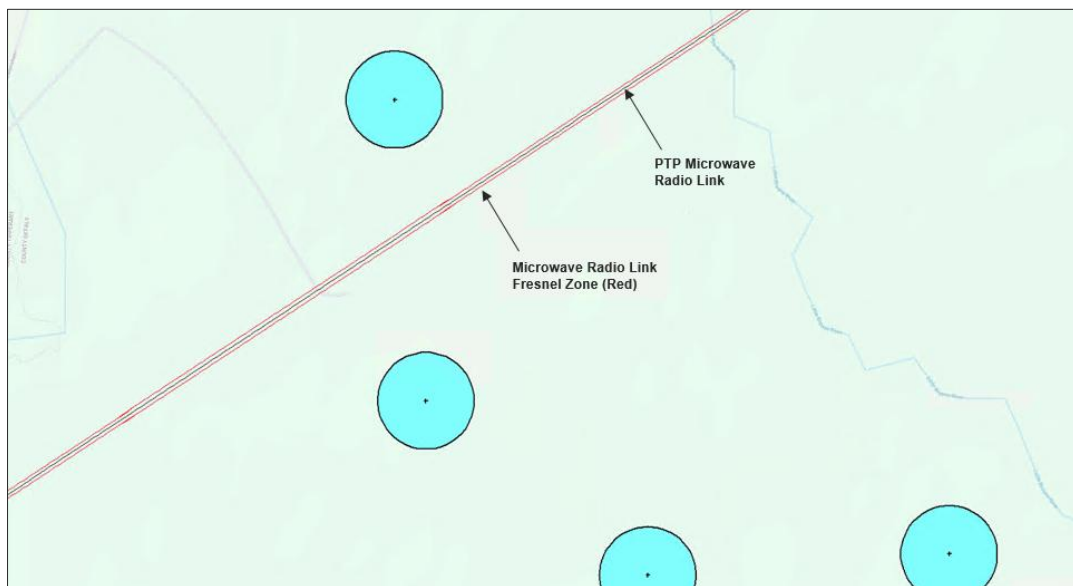



Figure 3. Example of microwave radio link crossing through the wind farm site modelled in radio planning software.

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 were undertaken with telecom network operators to assist in identifying telecommunication infrastructure that could be impacted by proposed wind farm. The operators were requested to raise any concerns they may have regarding impacts to their networks due to the proposed wind farm development.

An original round of consultations was undertaken in 2020, and additional consultations were undertaken in July of 2022. The most recent round of consultations was carried out in December of 2025. Table 3 lists the telecom operators contacted, and the issues raised by each operator.

ID	Operator	Issues raised by Operator / Observations.		
		2020 Consultations	2022 Consultations	2025 Consultations
1	2RN	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).	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).	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	An Garda Síochána	No response.	No response.	No issues.
3	Coimisiún na Meán*	No issues.	No issues.	No issues.
4	BT Ireland	No issues.	No issues.	No issues.
5	CIE	N/A	No response.	CIE have stated that the proposed wind farm would be located within the "Coordination Zone" of their GSM-R network (Mobile Network for Railways). The nearest rail line to Ballincor is 7.5 km away and at this distance there will be no impact to the GSM-R network.
6	Dept. of Defence	N/A	No response.	The DoD have acknowledged receipt of the consultation request, and to date, have raised no concerns regarding telecommunications networks.
7	Eir	Eir raised a concern regarding one Licensed PTP microwave radio link.	No issues with revised wind farm Viable Area.	Eir highlighted two Licensed PTP microwave radio links in the vicinity of the proposed development.
8	Enet	No response.	Enet raised a concern regarding one Licensed PTP microwave radio link.	Enet have raised a concern regarding one Licensed PTP microwave radio link.
9	ESB Networks	No issues.	No response.	No response. No issues expected.

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10	Imagine Broadband	No issues.	No issues.	No issues.
11	IAA / AirNav Ireland	No issues regarding transmission links; however, the IAA raised an aviation concern in relation to the proximity of the proposed wind farm to Birr Aerodrome.	No issues regarding transmission links; however, the IAA raised an aviation concern in relation to the proximity of the proposed wind farm to Birr Aerodrome.	No response. No issues expected regarding transmission links.
12	Uisce Éireann**	N/A	No response.	No issues.
13	Offaly County Council	No response.	No response.	No response. No issues expected.
14	Tipperary County Council	N/A	N/A	No response. No issues expected.
15	Tetra Ireland	No issues.	No issues.	No response. No issues expected.
16	Three Ireland	Three Ireland raised a concern regarding one Licensed PTP microwave radio link.	Three Ireland raised a concern regarding one Licensed PTP microwave radio link.	Three Ireland raised a concern regarding one Licensed PTP microwave radio link.
17	Viatal	N/A	No response.	No issues.
18	Virgin Media	No issues.	No issues.	No issues.
19	Vodafone	No issues.	No issues.	No issues.

Table 3. Telecom Operators Consulted

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

* Formerly known as the Broadcast Authority of Ireland (BAI)

** Formerly known as Irish Water.

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3.1.1 2RN Response to Consultations

2RN provided the following email response to consultations:

Email received April 2020

"We have no links in the area, my only concern would be the risk of interference to DTT viewers from Maghera and Kilduff. A protocol should be put in place should the site go ahead."

Email received Sept 2022

"There is no change to us from this addition, the only concern is for us is the DTT coverage from Maghera and Kilduff, which as I stated last time we would like a Protocol for if the site goes ahead."

Email received Dec 2025

"There have been no changes to our network in the area since 2022."

3.1.2 An Garda Síochána Response to Consultations

An Garda Síochána provided the following email response to consultations:

"no issues here, shinrone is nearest site over 5km away."

3.1.3 Coimisiún na Meán Response to Consultations

Coimisiún na Meán provided the following email response to consultations:

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

3.1.4 BT Ireland Response to Consultations

BT provided the following email response to consultations:

"BT no longer have microwave network."

3.1.5 CIE Response to Consultations

CIE provided the following email response to consultations:

"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: 5 Km < wind farm < 30 Km: this area, coordination between operators is required to fix any issue and impact on the signal propagation."

3.1.6 Department of Defence (DoD) Response to Consultations

The DoD provided the following email response to consultations:

"The Department of Defence wishes to acknowledge receipt of your below email. We will revert in due course."

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3.1.7 Eir Response to Consultations

Eir provided the following email response to consultations:

Email received March 2020

“We have one transmission links within the proposed area that could be at risk, the end points of the transmission link is below, for windfarm developments we would keep a buffer of 100 meters radius away from this transmission path as always.

Link 1 – End point 1 – 53° 1'10.59"N 7°59'0.74"W, End point 2 – 53° 2'47.25"N 7°54'56.98"W “

Email received July 2022

“The new area for July 2022 does not pose a risk to the Eir mobile and Eir fixed wireless networks.”

Email received Dec 2025

“We have the original link and one additional link added in the are alive but both seem to be now outside you scope area.”

#	Band	A-end	Height	B-end	Height
Link1	23Ghz	OY_4809 53° 1'10.59"N 7°59'0.74"W	15.5	<---> OY_4838 53° 2'47.25"N 7°54'56.98"W	16
Link2	13Ghz	OY_4809 53° 1'10.59"N 7°59'0.74"W	17	<---> OY_3940 53° 0'45.33"N 7°50'20.62"W	12



3.1.8 Enet Response to Consultations

Enet provided the following email response to consultations:

“We have one link passing through this area”

Link Name	A-End Coordinates	A-End Antenna Height	B-End Coordinates	B-End Antenna Height	Frequency	Buffer
VDF Nealstown / Carrig NS Birr	53.009344, -7.713289	15m	53.062987, - 7.971690	8m	11GHz	50m

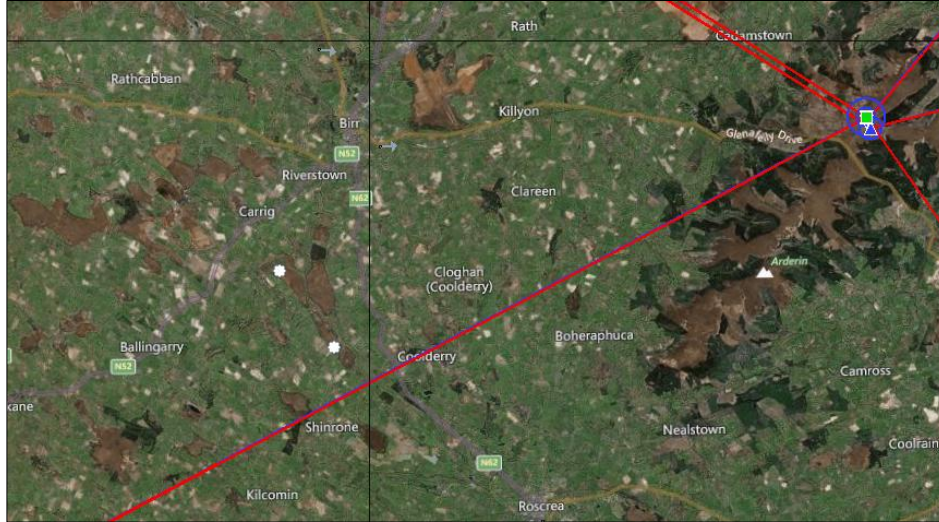
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3.1.9 ESB Networks Response to Consultations

ESB provided the following email response to consultations:

Email received April 2020

"I have checked, this planned development should not have any impact to our current Microwave nor our Point to Multipoint radio network. The closest turbine is just over 1.9km to our microwave link"



3.1.10 Imagine Broadband Response to Consultations

Imagine Broadband provided the following email response to consultations:

"Imagine are not affected by this development."

3.1.11 IAA / AirNav Ireland Response to Consultations

The IAA provided the following email response to consultations:

Email received Sept 2022

"Reviewing this at a high level, it appears that the new northern sites are within the safeguarding zone for the licensed aerodrome of Birr.


A 3km radius is applied generally for safeguarding purposes for Code 1 runways.

In the event of planning consent being sought, we would expect the Aerodrome Licensee to furnish observations in this regard and the Authority would likely support those observations.

In the event of planning consent being granted, the obstacle lighting requirement for developments that penetrate the obstacle limitation surfaces of an aerodrome would likely be quite onerous. Similar type proposals have resulted in a requirement for a Type A High Intensity white flashing light to be operational during day light and switching to steady red during hours of darkness.

Again, I would request that you would ask the developer to consult directly with the Aerodrome Licensee in relation to these proposals:

*ORMAND Flying Club Ltd.
Streamstown
Roscrea
Co. Tipperary
Phone:+353 57 912 1300
Phone:+353 87 0664545
Email: info@ormandflyingclub.ie
URL: http://www.ormandflyingclub.ie"*

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3.1.12 Uisce Éireann Response to Consultations

Uisce Éireann provided the following email response to consultations:

“There has been no change to our network in this area since our previous response in 2022.” [No issues raised in 2022]

3.1.13 Offaly County Council Response to Consultations

To date no response has been received.

3.1.14 Tipperary County Council Response to Consultations

To date no response has been received. The consultations that were sent to Tipperary County Council are included herein:

Consultation request sent to Tipperary County Council – February 2026.

RE: Ballincor Wind Farm Development.

Dear Sir/Madam,

Ai Bridges Limited has been engaged to prepare a Preliminary Telecommunications Impact Assessment for a proposed wind farm development at Ballincor, Co. Offaly. The wind farm developer is in the process of finalising a design layout for the proposed wind farm as part of an environmental impact assessment study. The proposed wind farm site located on the Offaly-Tipperary border, approximately 5 km southwest of Birr. Refer to attached Site Location Map and KMZ file.

Ai Bridges Ltd has been commissioned to engage with all potentially affected Telecoms Operators to identify and map the telecommunications networks traversing the proposed wind farm site. Ai Bridges will then generate a Telecommunications Infrastructure Constraints Map that will be used by the wind farm developer to assist in finalising an optimal wind farm design layout for the proposed development. We would be grateful if you could provide details of your telecommunications networks in the vicinity of the proposed wind farm study area in the tabular format below.

All telecommunications microwave network links will be modelled based on Fresnel Zone clearances with set-back safety buffers as required. It would be a condition that any proposed wind turbine would not be located inside a safety buffer zone to avoid interference on any of the telecommunications networks.

We would be grateful if you could confirm that this design layout approach, as agreed on previous wind farm studies, being taken by the wind farm developer is acceptable to you.

We would be grateful if you could provide your response to the above by close of business on February 25th 2026.

Link Name / ID	Band MHz/GHz	Link Length	Site A					Site B					
			Lat	Long	Easting	Northing	Ant Height	Lat	Long	Easting	Northing	Ant Height	

Yours sincerely,

Kevin Hayes
For and on behalf of Ai Bridges Limited
Ai Bridges Ltd.,

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Encl.

Ballincor Wind Farm Development - Site Location Map



Consultation request sent to Tipperary County Council – March 2026.

Dear Sir/Madam,

We are following up on our recent consultation regarding the Telecommunications Impact Assessment for the proposed wind farm development at Ballincor, which is located on the Offaly-Tipperary border.

As we have not received a response regarding this matter, it will be assumed that Tipperary County Council do not have any telecommunications networks in the vicinity of the proposed wind farm development.

Yours sincerely,

Kevin Hayes

For and on behalf of Ai Bridges Limited

3.1.15 Tetra Ireland Response to Consultations

Tetra Ireland provided the following email response to consultations:

Email received April 2020


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

3.1.16 Three Ireland Response to Consultations

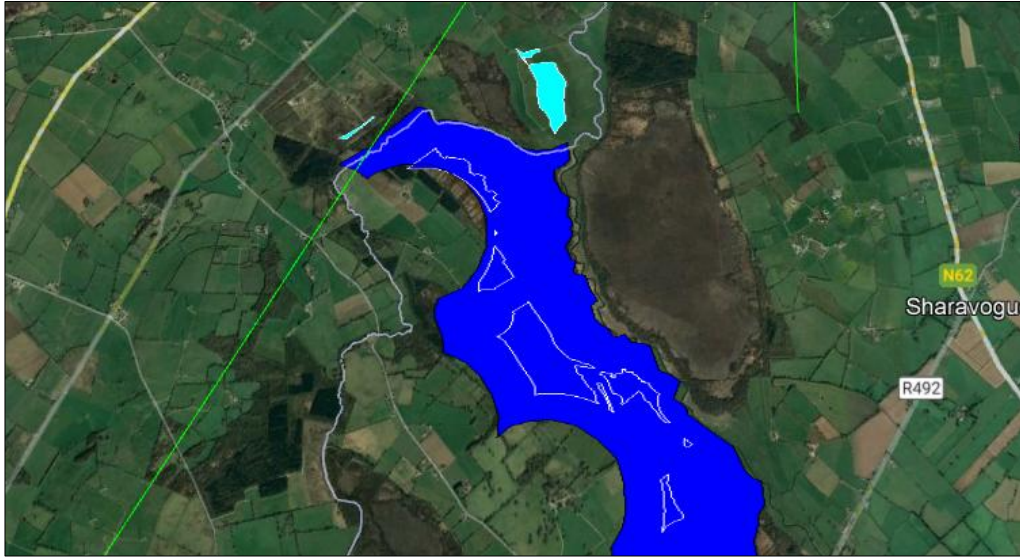
Three Ireland provided the following email response to consultations:

Email Received Sept 2022

“I have reviewed the revised Ballincor wind farm development area and 3Ireland have one microwave transmission link that traverses the area. The network topology has changed since the

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original response – there is now a new route for site TP0199. I have attached a spreadsheet with the revised link details. Below shows this new link.”

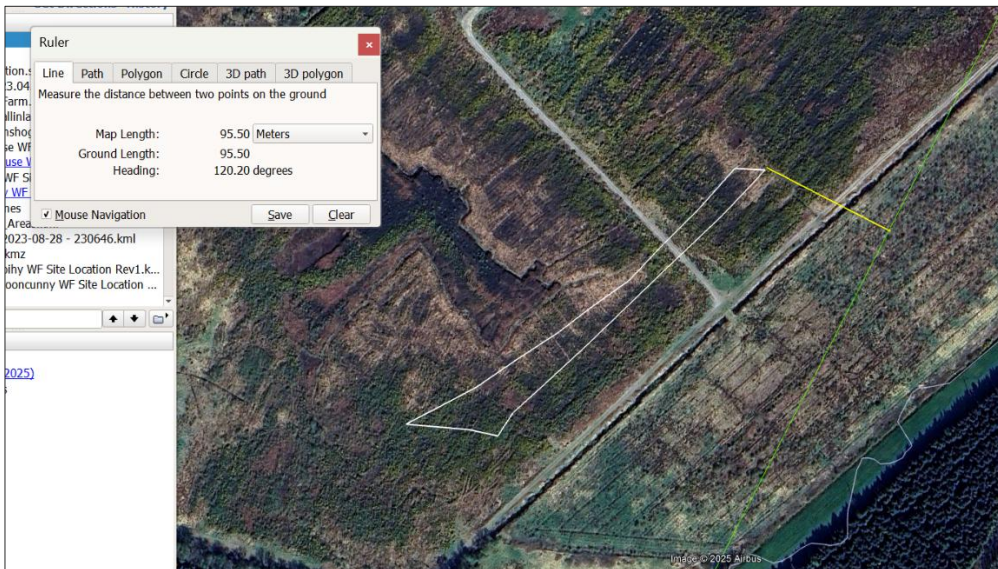


Link no.	Link Ref	Freq.	Length	Site A	X	Y	Dish Height	Site B	X	Y	Dish Height
1	ML020915	23GHz	9.5km	OF0073	205912	204702	25m	TP0199	201150	196507	15m

Email Received Dec 2025

“Still the same from 2022. We’ve one link between TP0199 and OF0073. It looks to pass through two of the outlines areas with 95m distance from the edge at the narrowest point so should be fine.”

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3.1.17 Viatel Response to Consultations

Viatel provided the following email response to consultations:

“No impact.”

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3.1.18 Virgin Media Response to Consultations

Virgin Media provided the following email response to consultations:

Email Received Sept 2022

“Virgin Media Ireland Do NOT have any radio links in the area show in blue or the light blue areas.




Email Received Jan 2026

*“Virgin Media Ireland DO NOT have any links in this area
Sorry for the late reply I’m playing catch up here.”*

3.1.19 Vodafone Response to Consultations

Vodafone provided the following email response to consultations:

“There are no changes to our network in the area since this was last looked at. This development will not impact Vodafone transmission in any way.”

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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, Mast-Site B, Mast-Site C, Mast-Site D, Mast-Site E and Mast-Site F) 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 Surveyed.

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Section 5 - Desktop Survey Analysis

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5 Introduction

Based on the findings of the consultation process, there are three Telecom Operators with networks in the vicinity of the proposed wind farm that require a detailed technical analysis:

- Eir Network
- Enet Network
- Three Ireland Network

Sections 5.1 to 5.3 below outline the desktop survey analysis findings* for each of the Telecom Operator networks listed above.

5.1 Eir Network Analysis

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


Link ID	Link Description
Eir_L1	PTP microwave radio link from Knockshe to Ballyegan
Eir_L2	PTP microwave radio link from Knockshe to Coolderry

Table 4. Eir Radio Links requiring Analysis



Figure 5. Eir Radio Network – Plan View

* 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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The 2D Plan View shown above indicates that Turbine T11 could impact the Eir microwave radio link between Knockshe and Coolderry (Eir_L2). To further assess the potential impact of T11, the radio link has been modelled in 3D and the Clearance Distances between the Fresnel Zone (F1) of the link and the blade-tip of the turbine has been calculated.

A 3D view of the microwave radio links relative to the proposed turbines is shown below in Figure 6. The results of the 3D analysis indicate T11 would obstruct the Fresnel Zone of the Eir radio link between Knockshe and Coolderry (i.e. the operation of the radio link would be impacted by T11).

Note: Each of the proposed turbines models, as described in Section 1.1 have been considered in the 3D analysis.




Figure 6. Eir Network – 3D View.

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

Link ID	Link Description	Nearest Turbine	Turbine Model	Fresnel Zone (F1) Clearance	Observations
Eir_L1	Knockshe - Ballyegan	T05	Vestas V150	> 100 m	No impacts
			Nordex N149	> 100 m	
			Nordex N163	> 100 m	
Eir_L2	Knockshe - Coolderry	T11	Vestas V150	- 69.35 m (Infringement into Fresnel Zone)	Link Impacted. (Mitigation measures required)
			Nordex N149	- 68.97 m (Infringement into Fresnel Zone)	
			Nordex N163	-75.47 m (Infringement into Fresnel Zone)	

Table 5. Eir Network – Analysis Summary

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5.2 Enet Network Analysis

The Enet network in the vicinity of the proposed wind farm consists of one Point-to-Point (PTP) microwave radio link. The radio link is listed below in Table 6, and a Plan View of the Enet network is shown in Figure 7.

Link ID	Link Description
Enet_L1	PTP microwave radio link from VDF Nealstown to Carrig N.S.

Table 6. Enet Radio Links requiring Analysis



Figure 7. Enet Radio Network – Plan View

The 2D Plan View shown above indicates that T01 would be the nearest of the proposed turbines to the Enet microwave radio link. To assess the potential impact of T01, the radio link has been modelled in 3D and the Clearance Distances between the Fresnel Zone (F1) of the link and the blade-tip of the turbine has been calculated.

A 3D view of the microwave radio link relative to the proposed turbines is shown below in Figure 8. The results of the 3D analysis indicate that the blade-tip of T01 would be more than 100 m away from the Fresnel Zone of the Enet radio link. At this distance, there would be no impact to the radio link.

Note: Each of the proposed turbines models, as described in Section 1.1 have been considered in the 3D analysis.


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Figure 8. Enet Network – 3D View.

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

Link ID	Link Description	Nearest Turbine	Turbine Model	Fresnel Zone (F1) Clearance	Observations
Enet_L1	VDF Nealstown - Carrig N.S.	T01	Vestas V150	> 100 m	No impacts
			Nordex N149	> 100 m	
			Nordex N163	> 100 m	

Table 7. Enet Network – Analysis Summary

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5.3 Three Ireland Network Analysis

The Three Ireland network in the vicinity of the proposed wind farm consists of one Point-to-Point (PTP) microwave radio link. The radio link is listed below in Table 8, and a Plan View of the Three Ireland network is shown in Figure 9.

Link ID	Link Description
3IRL_L1	PTP microwave radio link from Birr to Knockshe

Table 8. Three Ireland Radio Links requiring Analysis



Figure 9. Three Ireland Radio Network – Plan View

The 2D Plan View shown above indicates that one of the turbines (T03) would be relatively near to the Three Ireland microwave radio link. To further assess the potential impact of T02, the radio link has been modelled in 3D and the Clearance Distances between the Fresnel Zone (F1) of the link and the blade-tip of the turbine has been calculated.

A 3D view of the microwave radio link relative to the proposed turbines is shown below in Figure 10. The results of the 3D analysis indicate that the blade-tip of T03 would be more than 50 m away from the Fresnel Zone of the Three Ireland radio link. At this distance, there would be no impact to the radio link.

Note: Each of the proposed turbines models, as described in Section 1.1 have been considered in the 3D analysis.

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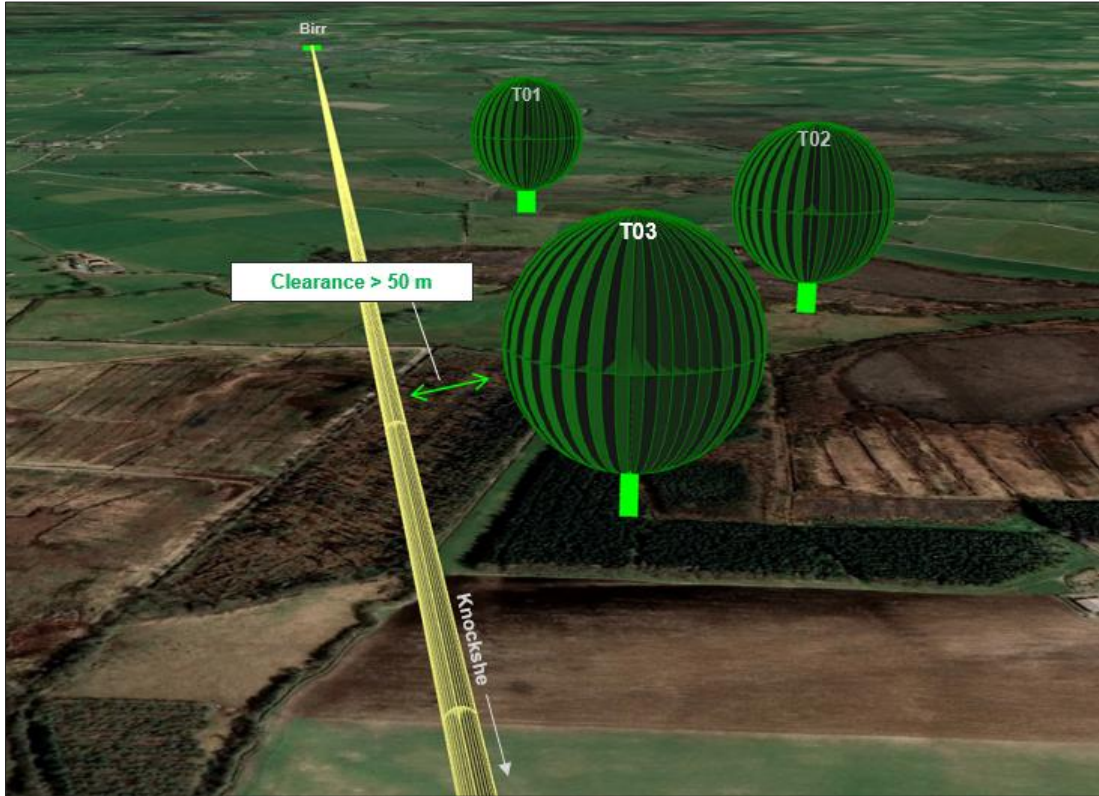



Figure 10. Three Ireland Network – 3D View.


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

Link ID	Link Description	Nearest Turbine	Turbine Model	Fresnel Zone (F1) Clearance	Observations
3IRL_L1	Birr - Knockshe	T03	Vestas V150	> 50 m	No impacts
			Nordex N149	> 50 m	
			Nordex N163	> 50 m	

Table 9. Three Ireland Network – Analysis Summary

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Section 6 - Mitigation Measures

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6. Mitigation Measures

Section 6.1 that follows, describes the mitigation measures available to the wind farm developer to offset the potential impact of the proposed turbines on the Eir Network.

6.1 Mitigation Measure Solutions – Eir Network

To offset the potential impact of T11 on the Eir radio link from Knockshe to Coolderry the following mitigation solutions are available:

- Option 1 – Relay via existing Eir Mast-Site
- Option 2 – Relay Mast located within the Proposed Wind Farm Site.
- Option 3 - Re-route service to Coolderry via an alternative Eir Mast-site.

These mitigation measures are described in Sections 6.1.1 to 6.1.3 that follow.

6.1.1 Option 1 – Relay via Existing Eir Mast-Site

The service to/from Coolderry could be relayed via an existing Eir mast-site. The existing telecoms mast at Brosna has been identified as a mast, which could potentially be used for this purpose. This mitigation measure is illustrated in Figure 11 below.



Figure 11. Relaying via Existing Eir Mast Site

Radio link path profiles and link budgets indicate that the proposed radio links (required for this mitigation measure solution) would meet the Radio Link Availability Criteria required by ComReg for radio licensing.

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6.1.2 Option 2 – Relay Mast located within the proposed Wind Farm Site

A relay mast at the location shown in the figure below could be used to offset any possible impact of turbine T11 on the Eir radio link between Knockshe and Coolderry.



Figure 12. Proposed Relay Mast Location

Radio link path profiles and link budgets indicate that the proposed radio links (required for this mitigation measure solution) would meet the Radio Link Availability Criteria required by ComReg for radio licensing.

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6.1.3 Option 3 – Re-route service to Coolderry via an alternative Eir Mast-site

The service to Coolderry could be delivered (re-routed) via an alternative Eir mast-site. The existing telecoms mast-site at Roscrea has been identified as a site, which could potentially be used for this purpose. This mitigation measure is illustrated in Figure 13 below.




Figure 13. Re-routing via an alternative Eir Mast-site

Preliminary radio link analysis (path profile and link budgets) indicates that the proposed radio link (required for this mitigation measure solution) would meet the Radio Link Availability Criteria required by ComReg for radio licensing; however, additional investigations and technical analysis would be required to confirm this.

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Section 7 - Recommendations

	Procedure: 001	Rev: 9.0
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7. Recommendations

To offset any potential impact to the Eir Radio link between Knockshe and Coolderry due to the proposed wind turbines, it is recommended that the following technically viable mitigation measure proposal should be effected as a condition of planning in the event of a successful planning application. In the case where the proposed wind farm is consented, it is recommended that additional consultations with Eir are undertaken to discuss and agree on the technical details of the proposed mitigation measure solution.

The Applicant would agree to cover the costs associated with the implementable and viable mitigation measure as outlined below.

Radio Link	Recommended Mitigation Measures
Eir_L2 (Knockshe to Coolderry)	<p><u>Option 1.</u> A Transmission Link Relay via an existing Eir Telecoms Mast-site. (i.e. re-routing of the existing Eir radio link via another existing telecoms mast structure, e.g. Brosna)</p>
	<p><u>Option 2.</u> Relay Mast located within the proposed wind farm site. (i.e. relaying the existing Eir radio link via a new relay mast structure that would be erected at a suitable location within the proposed wind farm development site.)</p>
	<p><u>Option 3.</u> The service to Coolderry could be delivered (re-routed) via an alternative Eir mast-site. (i.e. the existing telecoms mast-site at Roscrea could potentially be used to route the Eir service into Coolderry, instead of a radio link from Knockshe.)</p>

Table 10. Recommended Mitigation Measure (Post Planning Consent)

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Section 8 - Conclusions

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8. Conclusions

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

- Results from the telecom operator consultations and desktop survey analysis indicate that there are four radio links that cross over/near the proposed development. These radio links are listed below in Table 11.
- Network analysis indicates that one of the radio links would be impacted by the proposed turbine layout. (i.e. the Eir radio link between Knockshe and Coolderry (Eir_L2)).
- In the case where the proposed wind farm is consented, it is recommended that the mitigation measure strategy as set out in Section 7 of this report, should be agreed as per a protocol agreement. The Applicant would agree to cover the costs associated with the implementable and viable mitigation measure as outlined below.


Telecom Operator	Radio Link ID	Radio Link Description	Observations	Mitigation Measures (Post-Consent)
Eir	Eir_L1	Knockshe to Ballyegan	No impacts.	N.A.
	Eir_L2	Knockshe to Coolderry	Interference Impact (Radio Link Fresnel Zone obstructed by T11)	Option 1: Relay via an Existing Eir Mast-site. Option 2: Relay Mast located within proposed wind farm site. Option 3: Re-route via an Alternative Eir Mast-stie.
Enet	Enet_L1	VDF Nealstown to Carrig N.S.	No impacts.	N.A.
Three Ireland	3IRL_L1	Birr to Knockshe	No impacts.	N.A.

Table 11. Radio Links in the vicinity of proposed wind farm.


- Figure 14 has been provided to illustrate the radio links in vicinity of proposed wind farm development.



Figure 14. Plan View of Radio links in vicinity of proposed wind farm.

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APPENDIX A – Wind Farm Turbine Coordinates

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Appendix A – Wind Farm Turbine Coordinates


The coordinates of the turbines considered in this Telecommunications Impact Study are provided in the Table below.

Turbine ID	Co-ordinates (ITM)	
	Easting's (m)	Northing's (m)
T1	603543	700238
T2	603357	699569
T3	602829	699234
T4	603429	699037
T5	603554	698399
T6	603608	697889
T7	603985	697594
T8	604497	697630
T9	604826	697259
T10	604588	696601
T11	604897	696234

Table 12. Wind Farm Layout - Turbine Co-ordinates

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APPENDIX B – Field Survey Findings

	Procedure: 001	Rev: 9.0
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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 15 below.



Figure 15. 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 (Knockshe)

Telecommunications Mast-Site A is located at Knockshe, Co Tipperary and is approximately 3 km southwest of the proposed wind farm. A photo of the masts 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 13.



Figure 16. Mast-Site A

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast A1	Eir, Three Ireland

Table 13. Field Survey Summary – Mast-Site A

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Mast-Site B (Carrig N.S.)


Telecommunications Mast-Site B is located at Carrig National School, Carrig, Co Tipperary and is approximately 2 km northwest 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 14.



Figure 17. Mast-Site B

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast B1	Enet

Table 14. Field Survey Summary – Mast-Site B

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Mast-Site C (Birr)


Telecommunications Mast-Site C is located in the town of Birr, Co Offaly and is approximately 5 km north 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 15.



Figure 18. Mast-Site C

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

Table 15. Field Survey Summary – Mast-Site C

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Mast-Site D (Ballyegan)

Telecommunications Mast-Site D is in the townland of Ballyegan, Co Offaly, and is approximately 2 km east of the proposed development. 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-Site D

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast D1	Eir

Table 16. Field Survey Summary – Mast-Site D

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Mast-Site E (Coolderry)


Telecommunications Mast-Site E is located in the village of Coolderry, Co Offaly and is approximately 6 km east 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 17.



Figure 20. Mast-Site E

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast E1	Eir

Table 17. Field Survey Summary – Mast-Site E

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Mast-Site F (Nealstown)

Telecommunications Mast-Site F is located in the townland of Beagh, just north of Nealstown, and is approximately 14 km east 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 18.



Figure 21. Mast-Site F

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast F1	Enet

Table 18. Field Survey Summary – Mast-Site F

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