Report

Ballykett Wind Farm
EMI Impact Assessment
Report

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Executive Summary

Ai Bridges was commissioned to evaluate the possible impacts that the proposed wind farm development at Ballykett, Co. Clare 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.

Two telecommunications mast-sites were identified as sites with network infrastructure that could potentially be impacted by the wind farm development and a field survey of each of these mast-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, sixteen telecom operators were contacted. At the time of writing this report, ten of these operators have responded to the consultation request. 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 is at least one licensed microwave radio link that could potentially be impacted by the proposed Wind Farm development. The radio links that could potentially be impacted is listed below in Table 1.

Operator	Link Description	Impact of wind farm
Enet	Licenced PTP microwave radio link from Knockanore to Slievecallan W.F.	Potentially Impacted – Mitigation possible and dependent on turbine layout.
Virgin Media	Licenced PTP microwave radio link from Knockanore to Slievecallan W.F.	Potentially Impacted – Mitigation possible and dependent on turbine layout.

Table 1. Microwave radio links radio links crossing the wind farm site boundary.

None of the Telecommunication Operators contacted during the consultation process raised any concerns regarding telecommunications networks operating in the licence-exempt frequency bands. Also there was no impacts reported by any of the telecommunications operators operating GSM Radio Access, Mobile Broadband Data Access, Tetra, Telemetry or TV/Radio Transmission networks.

Sections

Appendix

Section 1 - Wind Farm Site Information

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 in County Clare approximately 2.5 km northeast of the town of Kilrush. The development is in the pre-planning stage and exact details regarding the quantity, location and turbine dimension have yet to be finalized.

Wind Farm	Number of Turbines	Turbine Hub Height	Turbine Rotor Diameter
Ballykett	TBC	TBC	TBC

Table 2. Wind Farm Turbine Details

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

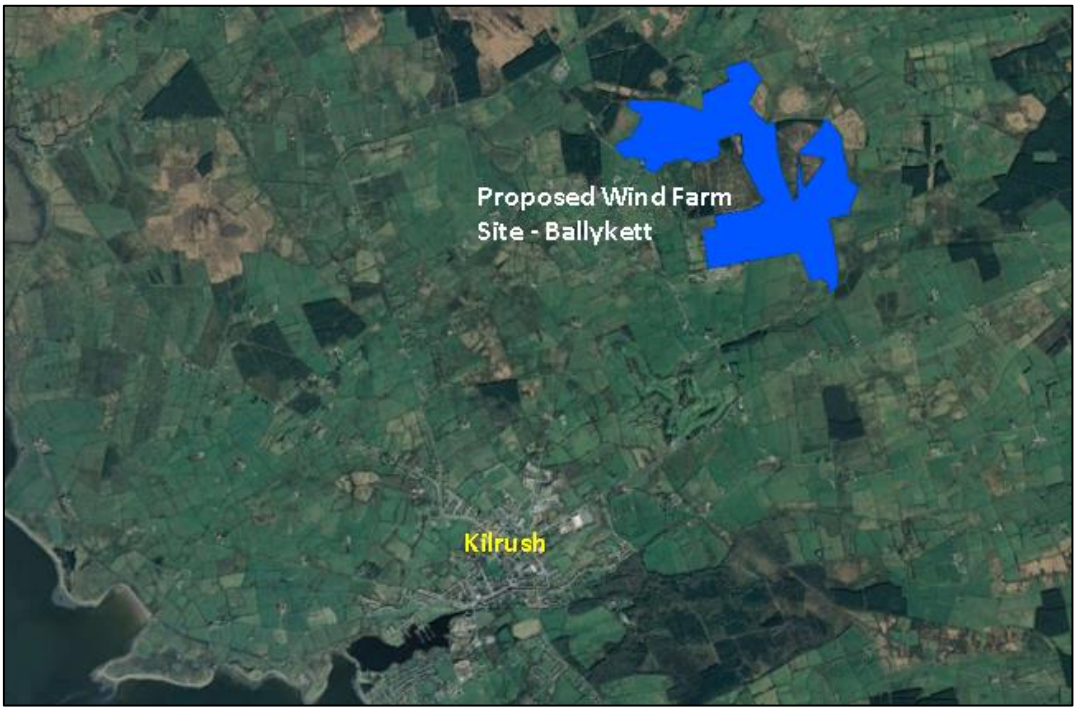

Figure 1. Location of proposed wind farm.

Section 2 - Methodology

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 Modelling 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 Ballykett. Figure 2 below shows the proposed wind farm site boundary plotted in the radio planning tool.

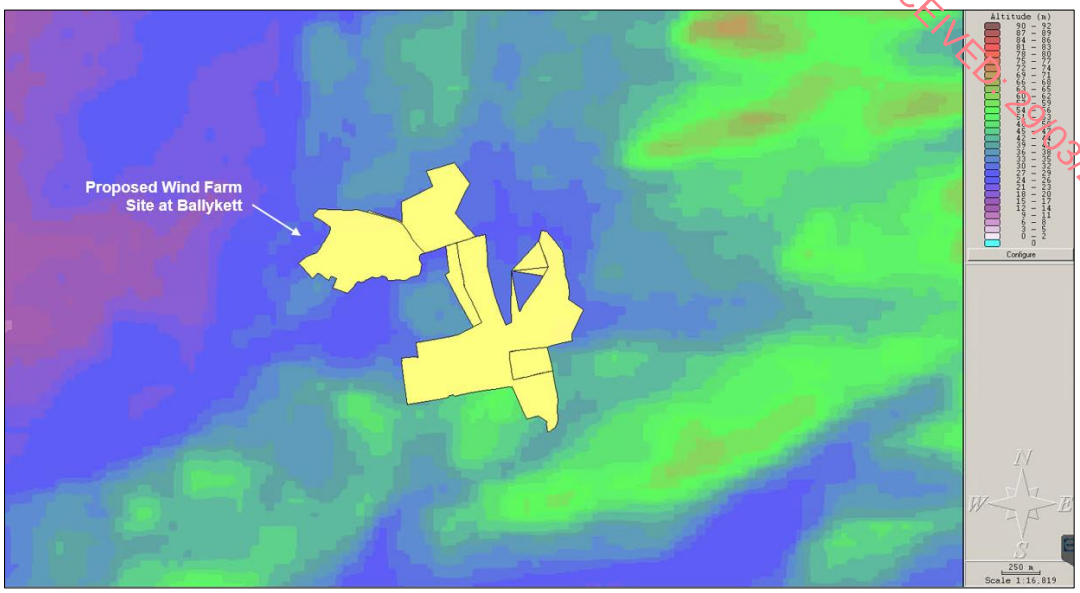

Figure 2. Wind Farm Site Boundary plotted in Radio Planning Software

The findings from the consultations and field surveys are collated and the communications networks requiring further analysis are identified. 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/near the wind farm site boundary modelled in radio planning software.

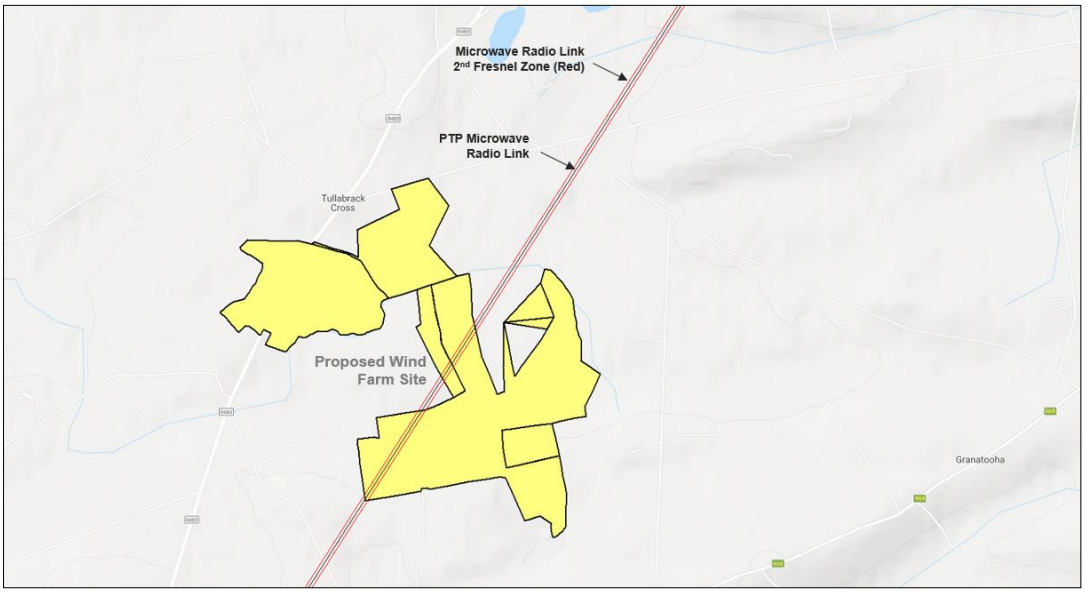

Figure 3. Example of microwave radio link crossing near the proposed wind farm site boundary modelled in radio planning software.

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.

Section 3 - Telecom Operator Consultations

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 beginning in May 2022 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. 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 3.1.16.

ID	Operator	Response Received (Yes/No)	Issues raised by Operator \ Observations.
1	Enet	Yes	Enet have raised a concern regarding two Licensed PTP microwave radio links.
2	An Garda Síochána	No	No response. (No response expected.)
3	Broadcast Authority of Ireland (BAI)	Yes	No issues
4	BT Ireland	Yes	No issues
5	Eir	Yes	No issues
6	ESB Networks	No	No response.
7	Irish Aviation Authority (IAA)	No	No response. (No response expected.)
8	Imagine Broadband	Yes	No issues.
9	Clare County Council	No	No response. (No response expected.)
10	Viatel	No	No response. (No response expected.)
11	2RN	Yes	No issues regarding transmission links; however, 2RN have raised concerns about their broadcast service in the area and have requested that a protocol document be signed should the wind farm go ahead.
12	Tetra Ireland (TI)	Yes	No issues.
13	Three Ireland	Yes	No issues.
14	Virgin Media	Yes	Virgin Media have raised a concern regarding one Licensed PTP microwave radio link.
15	Vodafone Ireland	Yes	No issues.
16	Dept. of Defence	No	No response. (DoD is a statutory consultee and have previously stated that they will only respond to the Planning Authority under an RFI at Planning Application Stage.)

Table 3. Telecom Operators Consulted

3.1.1 Enet Response to Consultations

Enet provided the following email response to consultations:

> *"See analysis attached and potential impacts below:"*

Link Name / ID	Band MHz\GHz	Link Length	Site A					Site B				
			Lat	Long	Easting	Northing	Ant Height	Lat	Long	Easting	Northing	Ant Height
TC Knockanore - Slievecallin Wind Farm	7GHz		52°31'24.75"N	9°36'18.83"W			13m	52°49'43.16"N	9°17'3.75"W			7m
TC Knockanore - Clonanbeg National School	8GHz		52°31'24.75"N	9°36'18.83"W			16m	52°45'42.60"N	9°23'25.30"W			7m

3.1.2 An Garda Síochána

To date no response has been received.

3.1.3 Broadcast Authority of Ireland (BAI)

The BAI provided the following email response to consultations:

> *"The BAI 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."*

3.1.4 BT Ireland

BT provided the following email response to consultations:

> *"We only have a network presence in Louth and Waterford."*

3.1.5 Eir Response to Consultations

Eir provided the following email response to consultations:

Site No.	Wind Farm Site	Potential Impact (Y \ N)
2	Ballykett, Co Clare	N

3.1.6 ESB Networks Response to Consultations

To date no response has been received.

3.1.7 IAA Response to Consultations

To date no response has been received.

3.1.8 Imagine Broadband Response to Consultations

Imagine Broadband provided the following email response to consultations:

Site No.	Wind Farm Site	Potential Impact (Y \ N)
2	Ballykett, Co Clare	N

3.1.9 Clare County Council Response to Consultations

To date no response has been received.

3.1.10 Viatel Response to Consultations

To date no response has been received:

3.1.11 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 response received from 2RN is provided below.

> *"With all of the sites there is a risk of interference to broadcast services from our site at Maghera in the areas proposed and we would ask that a protocol be signed between the developer and 2rn."*

3.1.12 Tetra Ireland (TI) Response to Consultations

Tetra Ireland provided the following email response to consultations:

> *"We anticipate no impact from the development as proposed, can you ensure the development is also reviewed by eir."*

3.1.13 Three Ireland Response to Consultations

Three Ireland provided the following email response to consultations:

Site No.	Wind Farm Site	Potential Impact (Y \ N)
2	Ballykett, Co Clare	N

3.1.14 Virgin Media Response to Consultations

Virgin Media provided the following email response to consultations:

> *"Yes there is a conflict with one VM Link. Details below"*

Link Name / ID	Band MHz\GHz	Link Length	Site A					Site B				
			Lat	Long	Easting	Northing	Ant Height	Lat	Long	Easting	Northing	Ant Height
Slieve Callan to Knockanore	13GHz	40km	52°49'42.02"N	9°17'3.17"W			10mt	52°31'25.26"N	9°36'20.92"W			10mt

3.1.15 Vodafone Ireland Response to Consultations

Vodafone provided the following email response to consultations:

Site No.	Wind Farm Site	Potential Impact (Y \ N)
2	Ballykett, Co Clare	N

3.1.16 Department of Defence Response to Consultations

To date no response has been received.

Section 4 - Field Surveys

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 and Mast-Site C) 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.

Section 5 - Desktop Survey Analysis

5. Introduction

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

- Enet Network
- Virgin Media

Sections 5.1 and 5.2 below outlines the desktop survey analysis findings* for each of the Telecom Operator networks listed above.

5.1 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 in Table 4 below and a Plan view of the Enet network is shown in Figure 5.

Link ID	Operator	Link Description
1	Enet	PTP microwave radio link from Knockanore to Slievecallan Wind Farm
2	Enet	PTP microwave radio link from Knockanore to Clohanbeg National School

Table 4. Enet Radio Links requiring Analysis

Figure 5. Enet 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.*

Figure 6 below shows a close-up view of the Enet microwave radio links relative to the proposed wind farm site. Desktop survey analysis indicates that the PTP radio link to Clohanbeg N.S. is 45m from the proposed wind farm site. At this distance there will be no impact to this radio link due to the wind farm development.

Desktop survey analysis also indicates that the PTP radio link from Knockanore to Slievecallan W.F. crosses over the site boundary and the proposed development may impact the operation of this radio link.

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

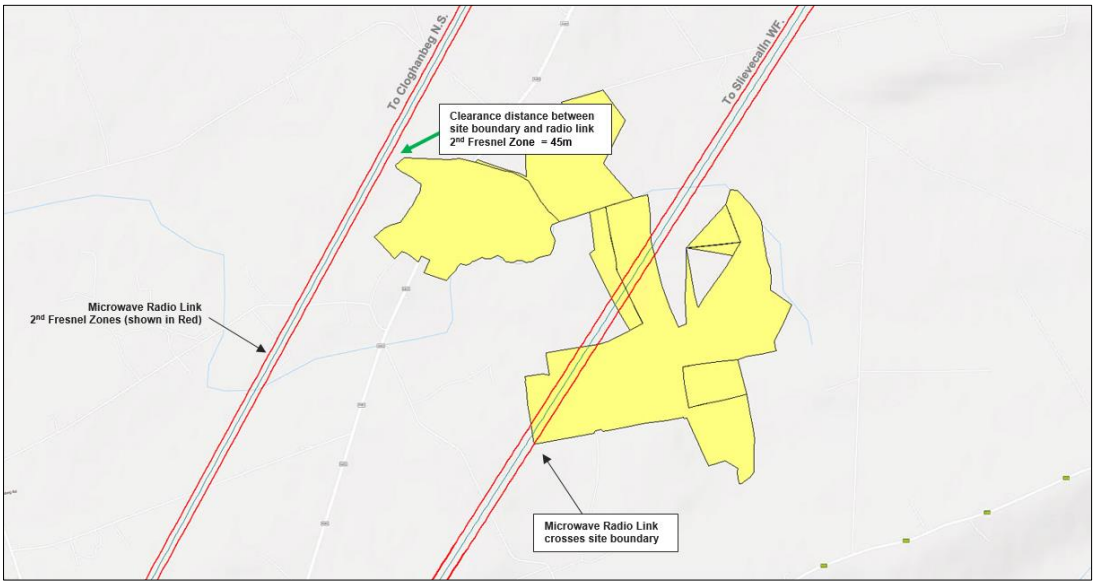

Figure 6. Enet Network – Close-up Plan View.

Link ID	Link Description	Link Type	Applicable Fresnel Zone	Wind Farm Impacts
Enet Link 1	Knockanore to Slievecallan W.F.	PTP	2nd Fresnel	Potentially impacted by wind farm. (Dependent on turbine layout).
Enet Link 2	Knockanore to Clohanbeg N.S.	PTP	2nd Fresnel	No Impacts. (Clearance distance of 45 m between wind farm site boundary and the 2nd Fresnel Zone of radio link).

Table 5. Enet Network – Analysis Summary

5.2 Virgin Media Network Analysis

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

Link ID	Operator	Link Description
1	Virgin Media	PTP microwave radio link from Knockanore to Slievecallan Wind Farm

Table 6. Virgin Media Radio Links requiring Analysis

Figure 7. Virgin Media Radio Network – Plan View

Figure 8 below shows a close-up view of the Virgin Media microwave radio link relative to the proposed wind farm site. Desktop survey analysis indicates that the PTP radio link crosses over the site boundary and the proposed development may impact the operation of the radio link.

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

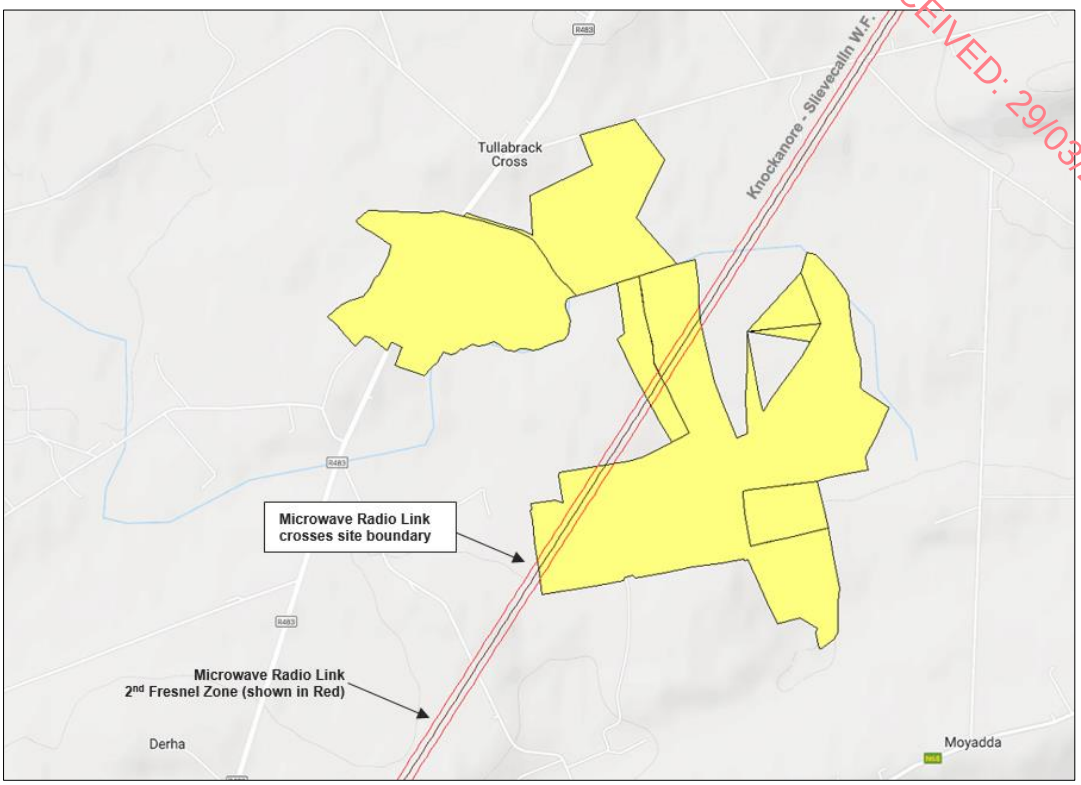

Figure 8. Virgin Media Network – Close-up Plan View.

Link ID	Link Description	Link Type	Applicable Fresnel Zone	Wind Farm Impacts
Virgin Media Link 1	Knockanore to Slievecallan W.F.	PTP	2nd Fresnel	Potentially impacted by wind farm. (Dependent on turbine layout).

Table 7. Virgin Media Network – Analysis Summary

Section 6 - Conclusions

6. 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 two radio links that cross over the wind farm site boundary.

- The radio links which could potentially be impacted by the wind farm development are listed below in Table 8.

Operator	Licensed PTP Link Description	Impact of Wind Farm
Enet	PTP microwave radio link from Knockanore to Slievecallan W.F	Potentially Impacted – Mitigation possible and dependent on turbine layout.
Virgin Media	PTP microwave radio link from Knockanore to Slievecallan W.F	Potentially Impacted – Mitigation possible and dependent on turbine layout.

Table 8. Radio Links in vicinity of proposed Ballykett Wind Farm development.

- Figure 9 below has been provided to illustrate each of the Telecommunication links that cross over the proposed wind farm site boundary. Operator links crossing over the site boundary could possibly be impacted by the wind farm development (dependent on wind turbine network layout).

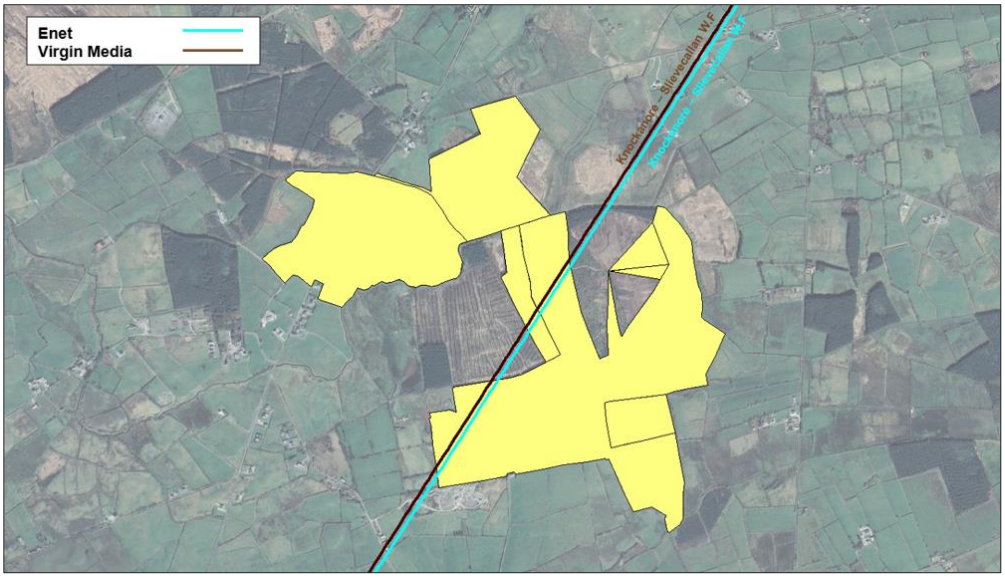

Figure 9. Telecommunication links crossing over the proposed wind farm site boundary

- There has been no response received from ESB Networks. Additional consultations have been sent out with a request to respond by close of business on 10/06/22.

APPENDIX A – Wind Farm Turbine Coordinates

Appendix A – Wind Farm Turbine Co-ordinates

The development is in the pre-planning stage and exact details regarding the quantity, location and turbine dimension have yet to be finalized.

APPENDIX B – Field Survey Findings

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 10 below.

Figure 10. Telecom Mast-Sites shown relative to proposed Wind Farm

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

Mast-Site A (Knockanore)

Telecommunications Mast-Site A is located at Knockanore, Co Kerry and is approximately 16 km southwest of the proposed wind farm. There are two masts (Mast A1 and Mast A2) at this location with network infrastructure that may be impacted by turbines at the proposed wind farm. A summary of the field survey findings for each of these masts is provided below.

Mast A1

A photo of Mast A1 is 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 9.

Figure 11. Mast A1

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

Table 9. Field Survey Summary – Mast A1

Mast A2

A photo of Mast A2 is 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 10.

Figure 12. Mast A2

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast A2	Virgin Media

Table 10. Field Survey Summary – Mast A2

Mast-Site B (Clohanbeg National School)

Telecommunications Mast-Site B is located in the townland of Clohanbeg, Co Clare and is approximately 13 km northeast of the proposed wind farm. The antenna at this mast-site is installed in the school grounds of Clohanbeg National School which 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 11.

Figure 13. Mast B

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

Table 11. Field Survey Summary – Mast B

Mast-Site C (Slievecallan)

Telecommunications Mast-Site C is located in the grounds of Slievecallan wind farm, Co Clare and is approximately 21 km northeast of the proposed wind farm at Ballykett. Access into Slievecallan wind farm was not possible on the day of survey, however an aerial view of the wind farm compound is shown in Figure 14. The Telecom Operator radio link antenna locations have been highlighted in Figure 13.

The Telecom Operators who have radio links operating from this mast-site in the direction of the wind farm are listed in Table 12.

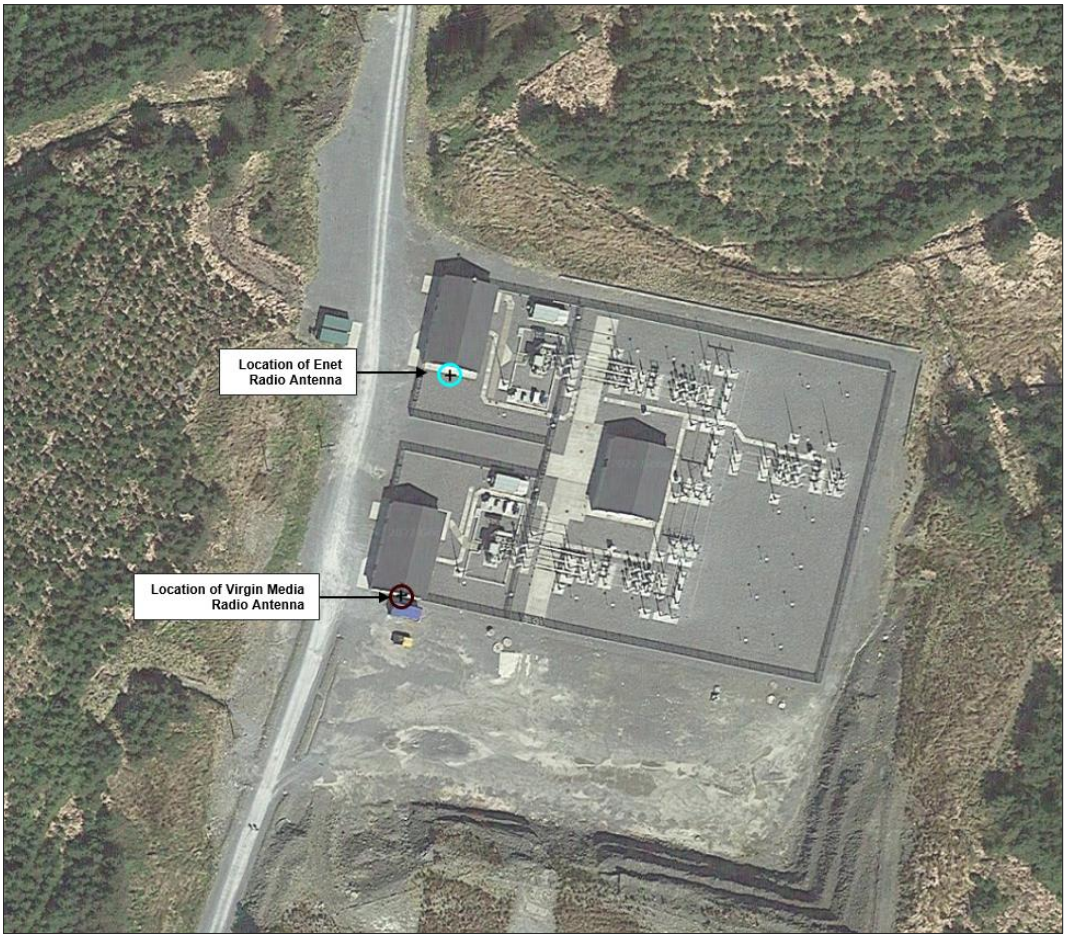

Figure 14. Mast-Site C (Slievecallan Wind Farm)

Mast ID	Telecom operators with radio links in direction of proposed wind farm
Mast C	Enet, Virgin Media

Table 12. Field Survey Summary – Mast C