

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Report

Moanmore Wind Farm EMI Impact Assessment Report

Document Number:

Author: Patrick Tinney

Approved for Release: Rev 1.0 KH **Date:** 03/06/2022

Document Filename: *Moanmore Wind Farm EMI Impact Assessment.*

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Executive Summary

Ai Bridges was commissioned to evaluate the possible impacts that the proposed wind farm development at Moanmore, 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 relevant telecommunication operator networks were analysed using radio planning \ modelling software. Results from the impact analysis found that there is one microwave radio link in the vicinity of the proposed wind farm (see Table1); however, the radio link is sufficiently far from the from the proposed wind farm site that it will not be impacted.

Operator	Link Description	Impact of wind farm
Enet	8GHz PTP microwave radio link from Knockanore to	No Impacts. (Clearance distance of 1.29 km between wind farm site boundary and the 2 nd Fresnel Zone of radio link).

Table 1. Microwave radio links in vicinity of proposed wind farm.

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.

AiBridges <i>Total Broadband Solutions</i>	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Sections

Section 1 - Wind Farm Site Information.....	4
Section 2 - Methodology	6
Section 3 - Telecom Operator Consultations	9
Section 4 - Field Surveys.....	13
Section 5 - Desktop Survey Analysis.....	15
Section 6 - Conclusions	18

Appendix

Appendix A – Moanmore Wind Farm Turbine Coordinates.....	20
Appendix B – Field Survey Findings.....	22

 <i>Total Broadband Solutions</i>	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Section 1 - Wind Farm Site Information

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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 3km northwest 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
Moanmore	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.

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Section 2 - Methodology

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

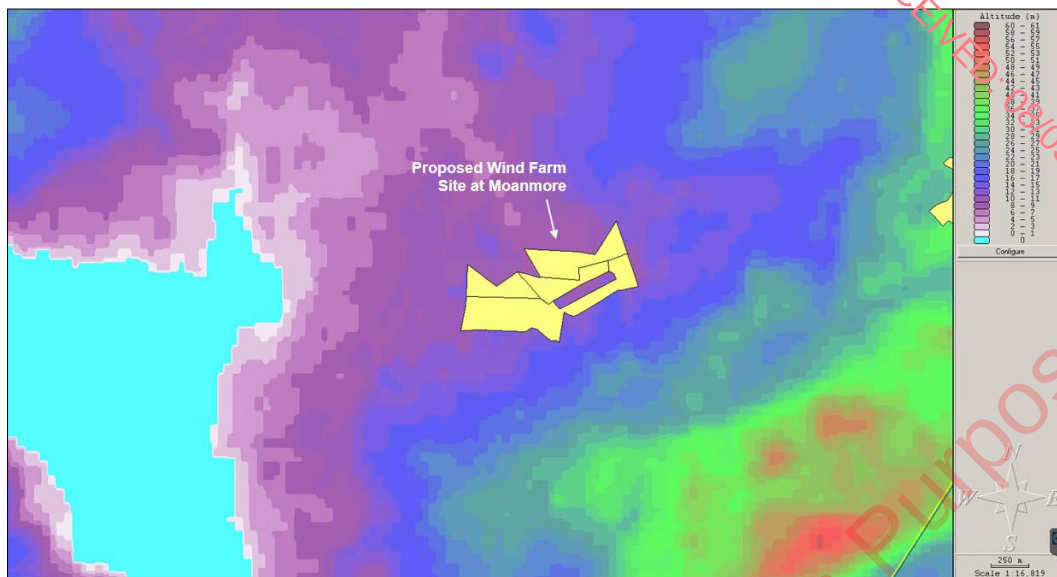


Figure 2. Wind Farm Site Boundary plotted in Radio Planning Software

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.

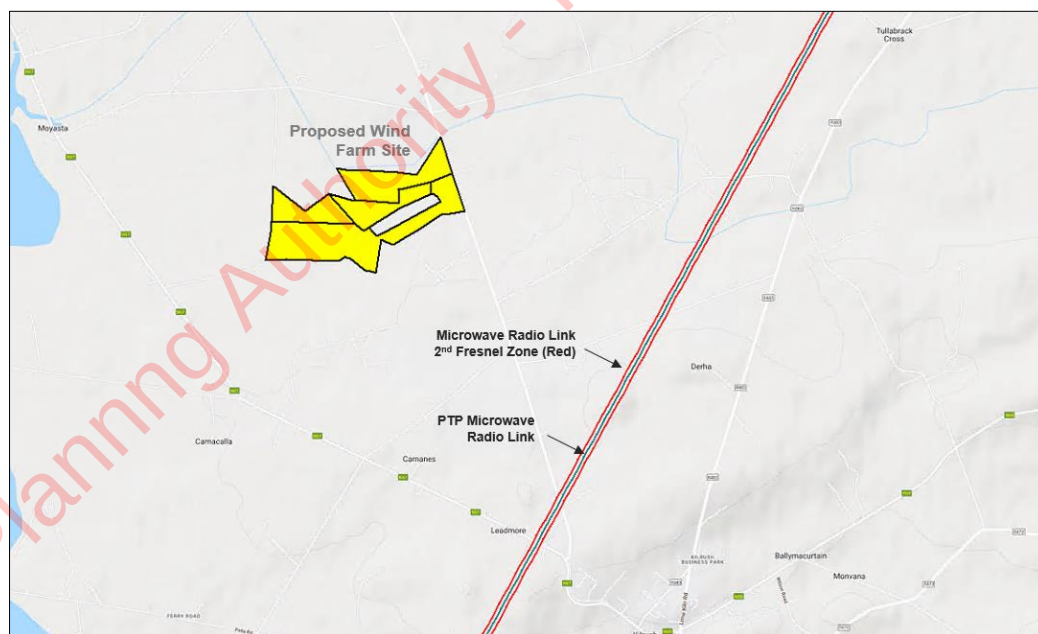


Figure 3. Example of microwave radio link crossing near the proposed wind farm site boundary modelled in radio planning software.

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.

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Section 3 - Telecom Operator Consultations

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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 1 PTP radio link in vicinity of proposed wind farm
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	No issues.
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

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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 - 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)
1	Moanmore, 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)
1	Moanmore, Co Clare	N

3.1.9 Clare County Council Response to Consultations

To date no response has been received.

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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)
1	Moanmore, Co Clare	N

3.1.14 Virgin Media Response to Consultations

Virgin Media provided the following email response to consultations:

Site No.	Wind Farm Site	Potential Impact (Y \ N)
1	Moanmore, Co Clare	N

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)
1	Moanmore, Co Clare	N

3.1.16 Department of Defence Response to Consultations

To date no response has been received.

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Section 4 - Field Surveys

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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 and Mast-Site B) 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.

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Section 5 - Desktop Survey Analysis

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

5. Introduction

Based on the findings of the consultation process, there is one Telecom Operator with a network in the vicinity of the proposed wind farm that require a detailed technical analysis:

- Enet Network

Sections 5.1 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 7.

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

Table 4. Enet Radio Links requiring Analysis

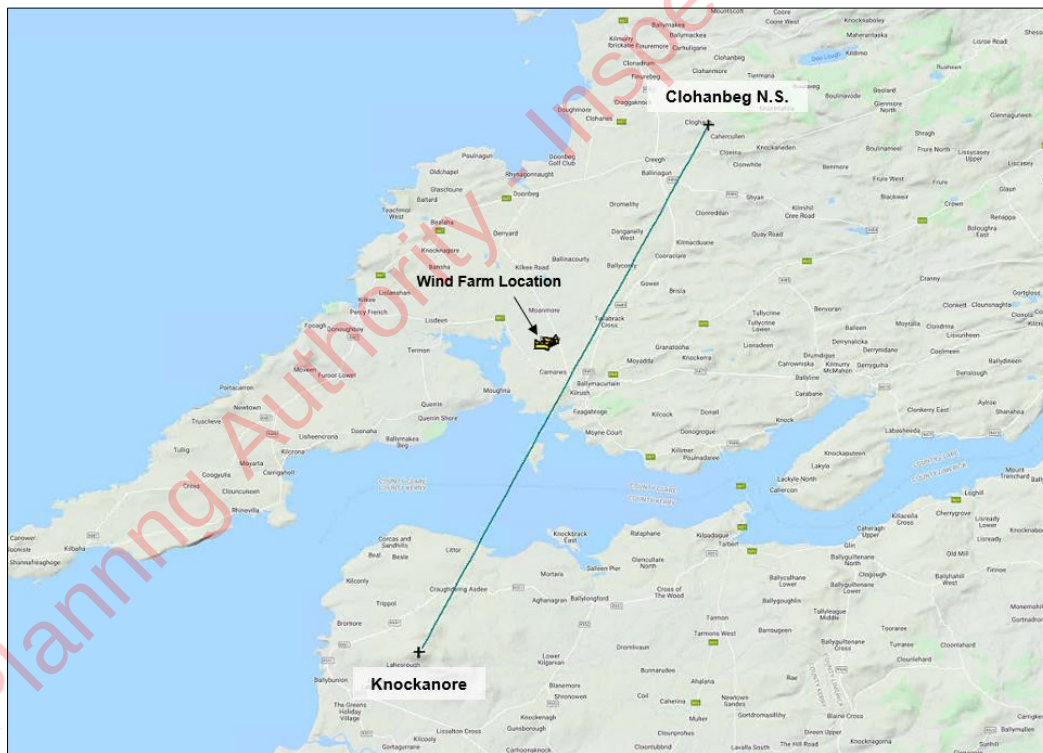


Figure 5. Enet Radio Network – Plan View

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

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Figure 6 below shows a close-up view of the Enet microwave radio link relative to the proposed wind farm site. Desktop survey analysis indicates that the PTP radio link is 1.29km from the proposed wind farm site. At this distance there will be no impact to the radio link due to the wind farm development.

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

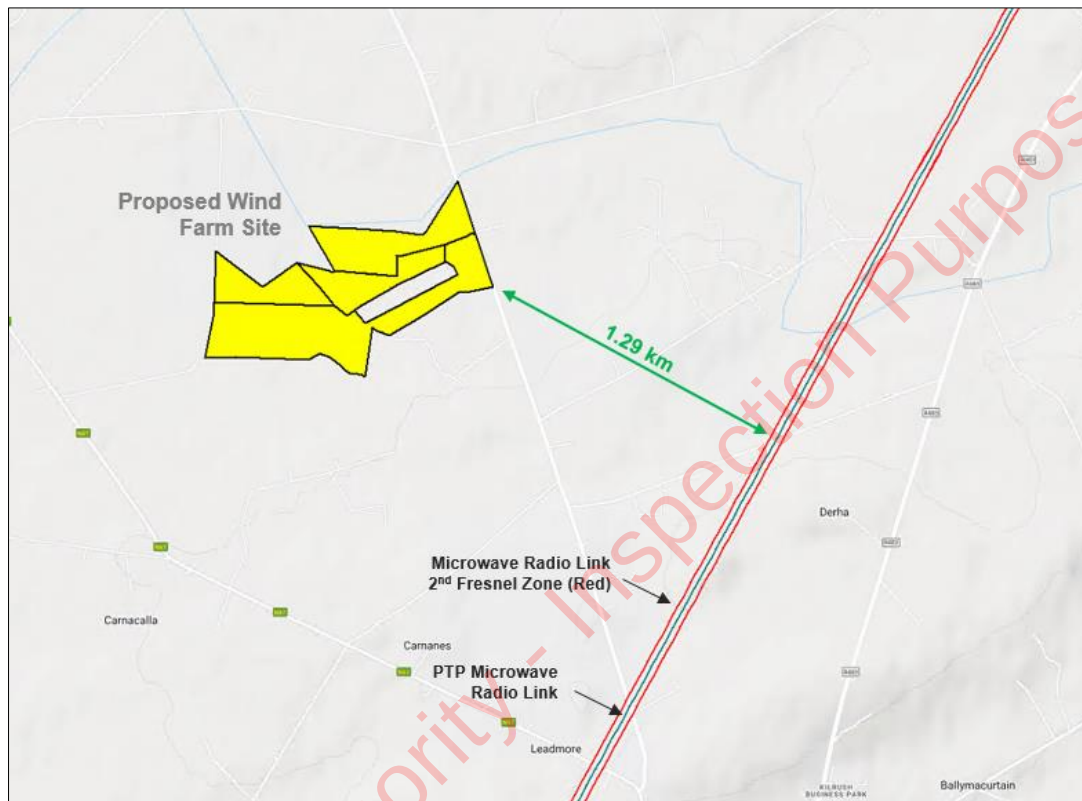


Figure 6. Enet Network – Close-up Plan View.

Link ID	Link Description	Link Type	Applicable Fresnel Zone	Wind Farm Impacts
Enet Link 1	Knockanore to Clohanbeg N.S.	PTP	2 nd Fresnel	No Impacts

Table 5. Enet Network – Analysis Summary

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

Section 6 - Conclusions

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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 one Licensed PTP microwave radio link in the vicinity of the proposed wind farm site.
- The Licensed PTP radio link in the vicinity of the Moanmore wind farm development is listed below in Table 6. The results from the network analysis indicates that this PTP radio link is 1.29 km from the proposed wind farm site. At this distance there will be no impact to the radio link due to the wind farm development.

Operator	Licensed PTP Link Description	Impact of Wind Farm
Enet	8 GHz PTP microwave radio link from Knockanore to Clohanbeg N.S.	No Impacts. (Clearance distance of 1.29 km between wind farm site boundary and the 2 nd Fresnel Zone of radio link).

Table 6. Radio Links in vicinity of proposed Moanmore Wind Farm development.

- 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.

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

APPENDIX A – Wind Farm Turbine Coordinates

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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.

 Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

APPENDIX B – Field Survey Findings

AiBridges <i>Total Broadband Solutions</i>	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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 7 below.



Figure 7. Telecom Mast-Sites shown relative to proposed Wind Farm

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

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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. 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 7.



Figure 8. Mast A

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

Table 7. Field Survey Summary – Mast A

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 1.0
Title: Moanmore EMI Impact Assessment	Approved: KH	Date: 03/06/22

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 8.



Figure 9. Mast B

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

Table 8. Field Survey Summary – Mast B