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APPENDIX 15-4

TELECOMMUNICATIONS
IMPACT ASSESSMENT

Mayo Planning Authority - Inspection Purposes Only!

 Total Broadband Solutions	Procedure: 001	Rev: 3.0
Title: Cunlaghfadda Wind Farm – Irish Rail Telecoms Impact Assessment	Approved: KH	Date: 29/04/26

Report

Cunlaghfadda Wind Farm Irish Rail Telecommunications Impact Assessment Report

Document Number:

Author: DMG/PT

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 Total Broadband Solutions	Procedure: 001	Rev: 3.0
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Executive Summary

During Telecom Operator Consultations in May 2023, Irish Rail were contacted by MKO by determine if they had any concerns in relation to the proposed wind farm at Cunlaghfadda in Co Mayo. In the respond received from Irish Rail, it was stated that they operate two communications systems in the vicinity of Cuglaghfadda: Analogue Train Radio and GSM -R Train Radio. Irish Rail also requested a 5 km Exclusion Zone around their transmitting radio antennas.

Ai Bridges Ltd were subsequently commissioned to evaluate the Irish Rail communications network and to assess the possible impacts that the proposed wind farm at Cunlaghfadda could have on the Irish Rail radio network. Field and desktop surveys of the Irish Rail network between Claremorris and Ballina were carried for the telecommunications assessment.

Analogue Train Radio systems operate in the UHF band of frequencies. Obstacles generally do not interfere with radio signals in this range unless the obstacle (e.g. wind turbine) is very near to the transmitting antenna (e.g. less than 500m) when it can inhibit the radio signals ability to “launch” correctly. Results from the field survey found only one analogue transmitter along the rail line in the vicinity of the Site. This transmitter is located at Claremorris Train station and is 5.1 km from the nearest of the proposed turbines. At this distance, there would be no impacts due to the proposed wind turbines.

GSM-R Train Radio is an international standard used by rail operators and also operates in the UHF band of frequencies. Like Analogue Train Radio, wind turbines are highly unlikely to interfere with GSM-R signals unless they are in close proximity to the transmitting basestation (e.g. less than 500m). During the Field Survey No GSM-R infrastructure was observed in vicinity of proposed wind farm.

The results of the field and desktop surveys indicate that the 5 km Exclusion Zone requested by Irish Rail is excessive. Other state operators (Emergency Services, Garda Síochána, etc) and commercial operators (Vodafone, Three Ireland and Eir), only raise concerns when proposed turbines are very close to their transmitters, typically less than 500m. It should also be noted that there are existing wind farms in the Claremorris area that are less than 1km from the Irish rail track. These existing wind farms are nearer to the rail line than the proposed turbines at the Site and have no detrimental impact on the Irish rail telecommunications network.

For the reasons outlined above, the proposed wind farm development at Cunlaghfadda is expected to have no impacts on the Irish Rail communications network.

Network Description	Comments	Wind Farm Impacts
Analogue Train Radio	Analogue Train Radio operates in the UHF band of frequencies. Transmitters in this band are generally not impacted by obstacles (e.g. wind turbine) unless the obstacle is less than 500 m from the transmitter. The proposed wind farm is over 5 km from the analogue transmitter located at Claremorris train station. Also, at 5.1 km the proposed turbines are outside the 5 km Exclusion Zone (around the transmitter) as specified by Irish Rail.	No impacts

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GSM-R Train Radio	No GSM-R infrastructure observed in vicinity of proposed wind farm. It should also be noted that there are existing wind farms in the Claremorris area that are located nearer to the Irish Rail track than the proposed wind farm at Cunlaghfadda. These wind farms appear to have had no detrimental impact to the Irish Rail communications network. As the Site is located further from the rail track than the existing wind farms, it is highly unlikely that there would be any impacts on the Irish Rail communications network due to the proposed turbines.	No impacts
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Table 1. Irish Rail Network Impact Summary.

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Section 1 - Wind Farm Site Information

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 3.0
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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 5 km northwest of Claremorris, Co Mayo. The dimensions of the proposed wind turbines are shown below in Table 2. The co-ordinates of the proposed turbine layout are provided in Appendix A.

Wind Farm	Number of Turbines	Turbine Hub Height	Turbine Rotor Diameter
Cunlaghfadda	7	92 m	136 m

Table 2. Wind Farm Turbine Details

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

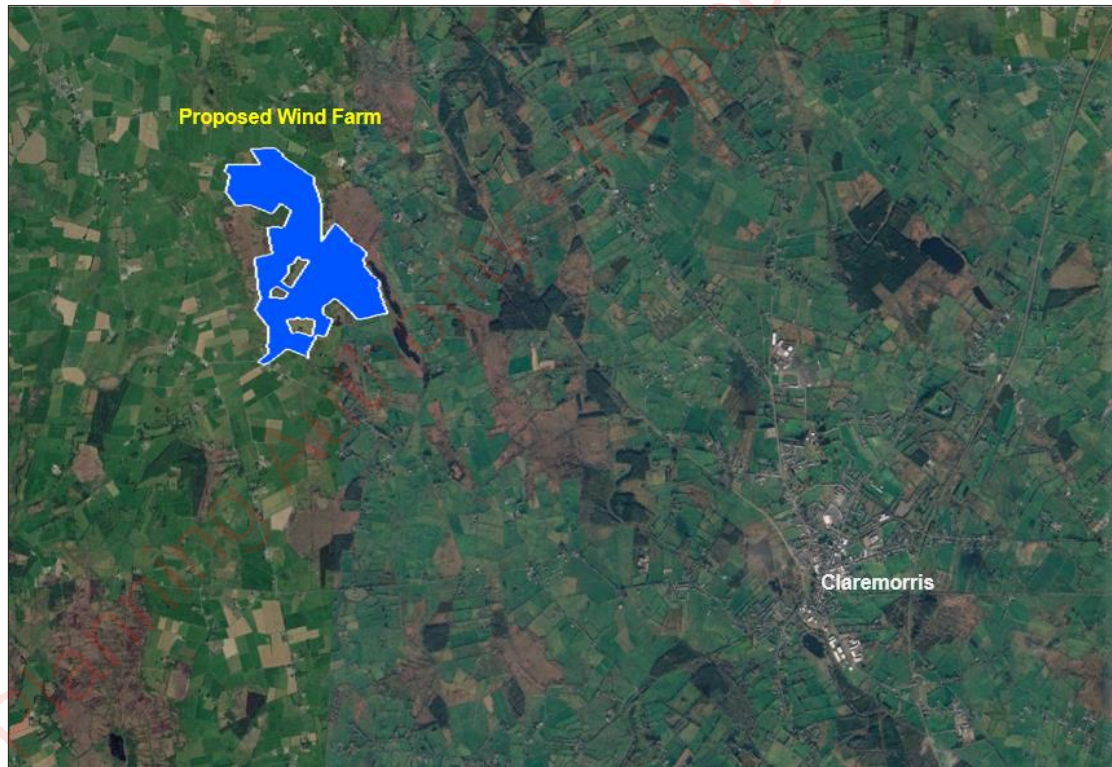


Figure 1. Location of proposed wind farm.

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Section 2 - Irish Rail Communications Network

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2. Introduction

Irish Rail operate a communications network along their rail tracks to facilitate communications between drivers and signallers. This communications network is used to increase safety, reduce delays and improve the general performance of the rail network. Irish Rail have stated that they use the following technologies:

- Analogue Train Radio
- GSM-R Train Radio

A description of each of these technologies is provided below in Section 2.1 and Section 2.2.

2.1 Analogue Train Radio

Analogue Train Radio operates in the UHF band of radio frequencies and is the older of the two technologies currently used by Irish Rail. Radio antennas, installed adjacent to the tracks, are used provide targeted radio coverage along the rail network.

Figure 2 below shows an example of a UHF antenna installed at an Irish Rail control building.

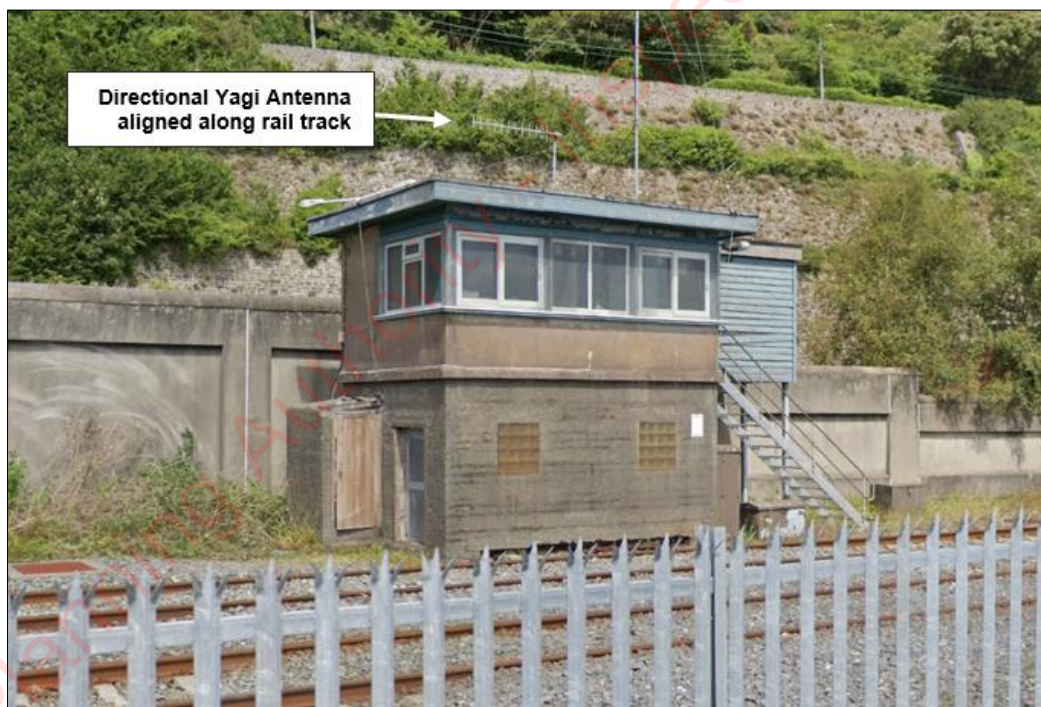


Figure 2. Example of Analogue Train Radio installation using a Yagi Directional Antenna

These analogue radio networks have limited functionality and had become increasingly expensive to maintain. As with other telecommunication networks, in recent years, there has been a move away from analogue systems in favour of digital systems which provide increased functionality and reliability. Irish Rail are currently phasing out their Analogue Train Radio system and migrating to the newer GSM-R radio technology.

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2.2 GSM-R Train Radio

GSM-R is an international standard used by rail operators for communication between trains, signallers and rail control centres. As previously mentioned, Irish Rail are currently migrating their communications network away from the older Analogue Train Radio system to this newer GSM-R Train Radio system. The benefits of GSM-R include:

- Digitally enabled.
- Increased safety features
- Improved performance
- Voice and data services over circuit switching
- Based on GSM technology
- Can roam onto public GSM networks

Figure 3 below shows an example of a GSM-R Train Radio installation in which directional sector antennas are used. The antennas are aligned in the direction of the rail line to provide targeted coverage and range along the rail line.



Figure 3. Example of GSM-R Train Radio installation using Directional Sector Antennas

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Section 3 - Irish Rail Consultations

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3. Introduction

Consultations beginning in May 2023 were undertaken by MKO, 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.

Irish Rail responded to their consultation request stating that they operate both Analogue Train Radio and GSM-R Train Radio in the Cunlaghafadda area. The correspondences between Irish Rail and MKO are provided in Section 3.1 below.

3.1 Irish Rail Response to Consultations

The correspondences between Irish Rail and MKO are provided below:

29.05.23 - Email sent by Irish Rail to MKO

"Hi,

IE have both Analogue Train Radio (TX: 456.175-456.450 MHz, RX: 461.675-461.95 MHz) and GSM-R Train Radio (TX: 876-880 MHz, RX: 921-925 MHz) in service in this area along the adjacent operational railway line.

Are there any interference characteristics from the development that may affect our systems?

Regards,

Thomas Quigley,
National Telecoms Manager,

12.09.23 - Email sent by Irish Rail to MKO

"Hi Karen,

Following up on the below, we have been provided recommendations from our GSM-R OEM concerning setback requirements as, in the case of wind turbines, it can be a desensitization effect with a reflection of GSM-R antenna signals by fixed surfaces or false echoes by reflection.

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

Regards,

Thomas Quigley,
National Telecoms Manager,
SET Department"

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12.09.23 - Email sent by MKO to Irish Rail

"Hi Thomas,

Thanks for getting back to me. Can you elaborate on the below:

- 1- **Exclusion zone**: wind farm not less than 5 Km from antenna.

What does the exclusion zone entail- the proposed wind farm location at Cunlaghfadda is within 5km of a railway line. Can you provide coordinates of the GSM-R antenna in the area?

- 2- **Coordination zone**: : 5Km<wind farm <30Km: this area, coordination between operators is required to fix any issue and impact on the signal propagation

Kind regards,

Karen.

Karen Mulryan

Project Environmental Scientist BA. MSc. MIAI. ClfA"

13.09.23 - Email sent by Irish Rail to MKO

"Hi,

The exclusion zone is 5km on either side of the railway line

Regards,

*Thomas Quigley,
National Telecoms Manager,
SET Department"*

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Section 4 - Field Surveys

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4. Introduction

To assess the Irish Rail communication network in the Cunlaghfadda area, field surveys were undertaken at specified locations along the rail track adjacent to the proposed wind farm. The field survey map and survey results are presented in Section 4.1 that follows.

4.1 Field Survey

Figure 4 below shows the proposed wind farm location relative to the Irish Rail train track which runs between Claremorris and Ballina. Seven survey points were selected along the track and each point was surveyed for the presence of telecommunications equipment (i.e. telecoms mast and/or radio antenna). The train station at Claremorris was also surveyed for telecommunications equipment.



Figure 4. Irish Rail Network - Field Survey Map.

The results from each survey point are presented below in Sections 4.1.1 to 4.1.8.

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4.1.1 Survey Point 1 (Garrynabba)

Survey Point 1 is located at the rail track in the townland of Garrynabba. Photographs of both sides of the rail line are shown in the figures below. A summary of the field survey findings at this location are provided in Table 3.



Figure 5. Survey Point 1 – View to Northwest



Figure 6. Survey Point 1 – View to Southeast

Survey Point ID	IR Network Type	Communications Infrastructure (Mast / Antenna) at Survey Point
SP 1 - Garrynabba	Analogue Train Radio	None
	GSM-R	None

Table 3. Field Survey Summary – SP1

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4.1.2 Survey Point 2 (Cloondroon)

Survey Point 2 is located at the rail track in the townland of Cloondroon. Photographs of both sides of the rail line are shown in the figures below. A summary of the field survey findings at this location are provided in Table 4.



Figure 7. Survey Point 2 – View to Northwest



Figure 8. Survey Point 2 – View to Southeast

Survey Point ID	IR Network Type	Communications Infrastructure (Mast / Antenna) at Survey Point
SP 2 - Cloondroon	Analogue Train Radio	None
	GSM-R	None

Table 4. Field Survey Summary – SP2

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4.1.3 Survey Point 3 (Knockthomas)

Survey Point 3 is located at the rail track in the townland of Knockthomas. Photographs of both sides of the rail line are shown in the figures below. A summary of the field survey findings at this location are provided in Table 5.



Figure 9. Survey Point 3 – View to Northwest



Figure 10. Survey Point 3 – View to Southeast

Survey Point ID	IR Network Type	Communications Infrastructure (Mast / Antenna) at Survey Point
SP 3 – Knockthomas	Analogue Train Radio	None
	GSM-R	None

Table 5. Field Survey Summary – SP3

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4.1.4 Survey Point 4 (Cloonboy)

Survey Point 4 is located at the rail track in the townland of Cloonboy. Photographs of both sides of the rail line are shown in the figures below. A summary of the field survey findings at this location are provided in Table 6.



Figure 11. Survey Point 4 – View to Northwest



Figure 12. Survey Point 4 – View to Southeast

Survey Point ID	IR Network Type	Communications Infrastructure (Mast / Antenna) at Survey Point
SP 4 - Cloonboy	Analogue Train Radio	None
	GSM-R	None

Table 6. Field Survey Summary – SP4

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4.1.5 Survey Point 5 (Mossbrook)

Survey Point 5 is located at the rail track in the townland of Mossbrook. Photographs of both sides of the rail line are shown in the figures below. A summary of the field survey findings at this location are provided in Table 7.



Figure 13. Survey Point 5 – View to Northwest



Figure 14. Survey Point 5 – View to Southeast

Survey Point ID	Network Type	Communications Infrastructure (Mast / Antenna) at Survey Point
SP 5 - Mossbrook	Analogue Train Radio	None
	GSM-R	None

Table 7. Field Survey Summary – SP5

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4.1.6 Survey Point 6 (Barnagreggaun)

Survey Point 6 is located at the rail track in the townland of Barnagreggaun. Photographs of both sides of the rail line are shown in the figures below. A summary of the field survey findings at this location are provided in Table 8.



Figure 15. Survey Point 6 – View to Northwest



Figure 16. Survey Point 6 – View to Southeast

Survey Point ID	IR Network Type	Communications Infrastructure (Mast / Antenna) at Survey Point
SP 6 - Barnagreggaun	Analogue Train Radio	None
	GSM-R	None

Table 8. Field Survey Summary – SP6

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4.1.7 Survey Point 7 (Ballintleva)

Survey Point 7 is located at the rail track in the townland of Ballintleva. Photographs of both sides of the rail line are shown in the figures below. A summary of the field survey findings at this location are provided in Table 9.



Figure 17. Survey Point 7 – View to Northwest



Figure 18. Survey Point 7 – View to Southeast

Survey Point ID	IR Network Type	Communications Infrastructure (Mast / Antenna) at Survey Point
SP 7 - Ballintleva	Analogue Train Radio	None
	GSM-R	None

Table 9. Field Survey Summary – SP7

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4.1.8 Survey Point 8 (Claremorris Train Station)

Survey Point 8 is located at Claremorris Train Station. A photograph of the telecoms mast at this location is shown in the figure below. A summary of the field survey findings at this location are provided in Table 10.



Figure 19. Survey Point 8 – Claremorris Train Station

Survey Point ID	IR Network Type	Communications Infrastructure (Mast / Antenna) at Survey Point
SP 8 - Claremorris Train Station	Analogue Train Radio	Omni-directional antenna installed near top of the telecoms mast at Train Station
	GSM-R	None

Table 10. Field Survey Summary – SP 8

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Section 5 - Desktop Survey Analysis

AiBridges Total Broadband Solutions	Procedure: 001	Rev: 3.0
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5. Introduction

Based on the consultation responses received from Irish Rail, there are two communication network types that require a detailed technical analysis:

- Analogue Train Radio
- GSM-R Train Radio

Sections 5.1 and Section 5.2 below outline the desktop survey analysis findings for each of the communication networks listed above.

5.1 Analogue Train Radio Analysis

The Analogue Train Radio equipment used by Irish Rail operates at relatively low frequencies in the UHF band (TX: 456.175-456.450 MHz, RX: 461.675-461.95 MHz). Objects such as turbines, do not interfere with UHF radio signals unless they are in close proximity to the transmitter (e.g. less than 500m) and in the near field of the radio antenna.

The only analogue radio equipment installed in the vicinity of the Site was the analogue antenna installed on the telecoms mast at Claremorris Train Station. The nearest of the proposed turbines is 5.1 km from this transmitter. At this distance there would be no impacts due to the proposed wind farm development. Also, at 5.1 km the proposed turbines are outside the 5 km Exclusion Zone (around the transmitter) as specified by Irish Rail.

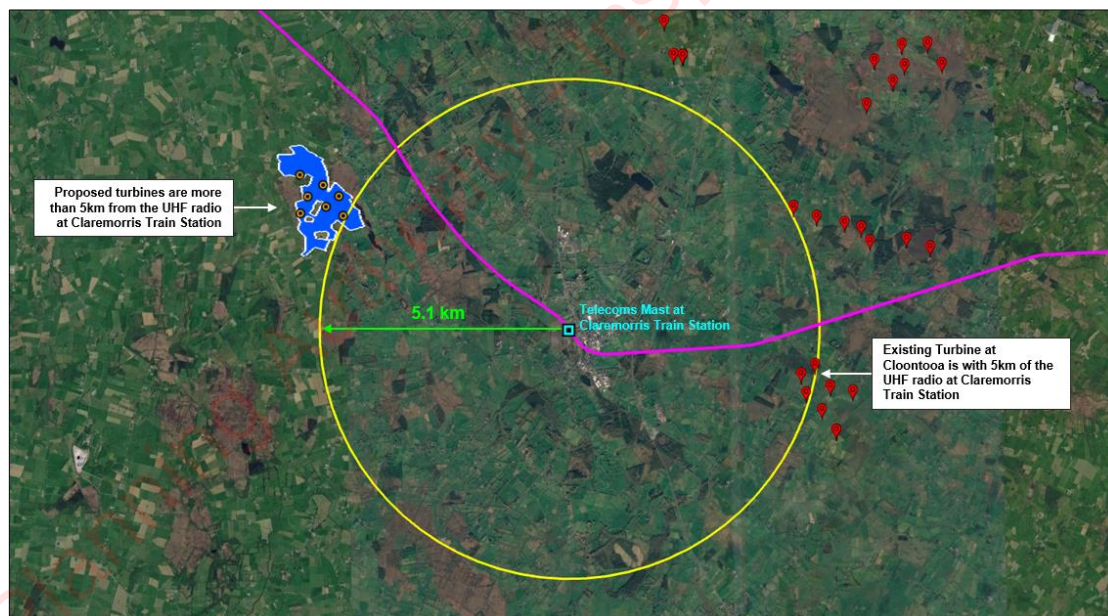


Figure 20. Proposed wind Turbines relative to the Analogue Transmitter at Claremorris Station

Network Type	Comments	Wind Farm Impacts
Analogue Train Radio	Objects such as turbines, do not interference with UHF signals unless they are in close proximity to the transmitter (e.g. less than 500m) and in the near field of the radio antenna. The proposed turbines are over 5 km from the analogue transmitter at Claremorris train station.	No impacts.

Table 11. Analogue Train Radio – Analysis Summary

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5.2 GSM-R Train Radio Analysis

As with analogue UHF radio transmitters, wind turbines generally do not interfere with GSM /GSM-R radio signals unless they are in close proximity to the transmitter. Commercial service operators do not raise any concerns regarding GSM access networks unless proposed turbines are very near their transmitters (e.g. less than 500m).

It should also be noted that there are existing wind farms in the Claremorris area that are located nearer to the Irish Rail track than the proposed wind farm at Cunlaghfadda. These wind farms appear to have had no detrimental impact to the Irish Rail communications network (Analogue Train Radio or GSM-R).

As the figure below shows, the wind farm at Cloontooa is just 0.6 km from the Irish Rail track. This is considerably nearer than the distance between the rail track and the proposed wind farm at Cunlaghfadda. The photograph shown in Figure 22 illustrates the proximity of the Cloontooa turbines relative to the Irish Rail track.

As the Site is located further from the rail track than the existing wind farms, it is highly unlikely that there would be any impacts on the Irish Rail communications network due to the proposed turbines. Also, the field survey findings indicate that Irish Rail do not have any GSM-R infrastructure in the vicinity of the proposed wind farm development.

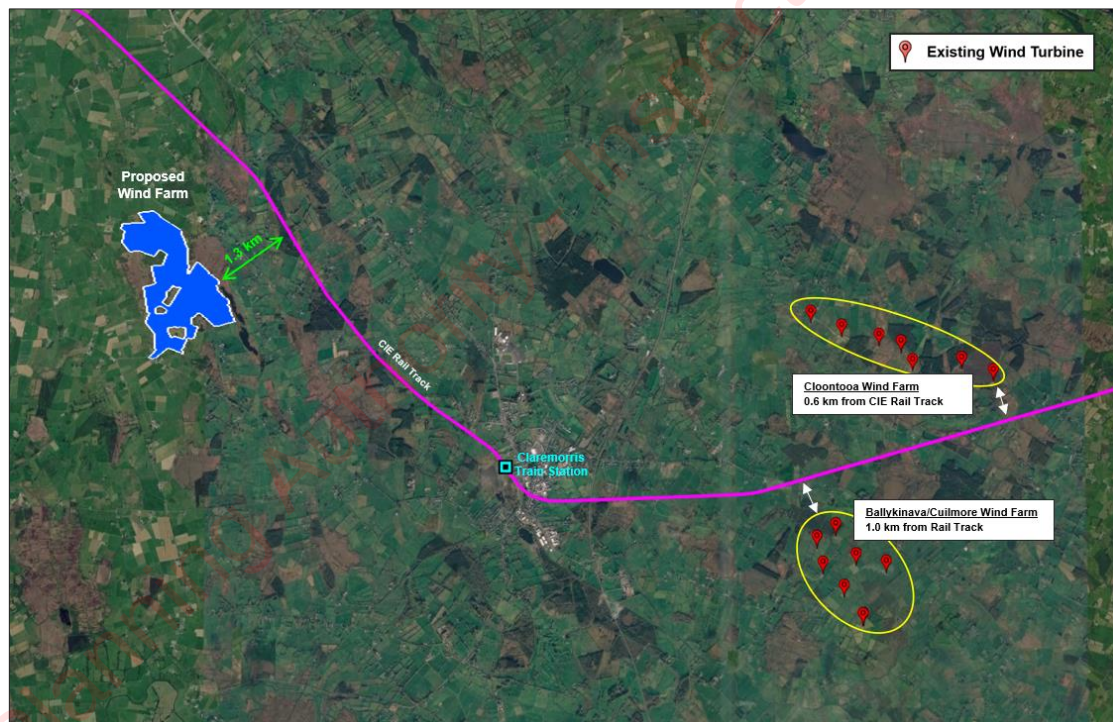


Figure 21. Existing Wind Farms near Irish Rail Track

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Figure 22. Cloontooa wind turbines shown relative to Irish Rail track

Network Type	Comments	Wind Farm Impacts
GSM-R Train Radio	The Site is over 1km from the nearest rail track. At this distance there would be no impacts to any GSM-R transmitter installed along the rail line. Also, it should be noted that there are existing turbines in the Claremorris area that are located less than 1km from the rail line. Field survey findings also indicate that there is no GSM-R network infrastructure currently installed in the vicinity of the Site.	No impacts.

Table 12. GSM-R Train Radio – Analysis Summary

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Section 6 - Conclusions

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6. Conclusions

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

- Results from the field survey indicate that Irish Rail has an Analogue Train Radio transmitter located at Claremorris Train Station.
- Analogue Train Radio operates in the UHF band of frequencies. Wind turbines generally do not cause interference to radio signals in this band, unless they are in close proximity to the transmitter (e.g. less than 500m). As the nearest of the proposed turbines is located 5.1 km from the Analogue Train Radio transmitter at Claremorris Train Station, there would be no impacts to due to the proposed wind farm.
- It should also be noted that there are existing wind farms in the Claremorris area that are located nearer to the Irish Rail track than the proposed wind farm at Cunlaghfadda. These wind farms appear to have had no detrimental impact to the Irish Rail communications network. As the Site is located further from the rail track than the existing wind farms, it is highly unlikely that there would be any impacts on the Irish Rail communications network due to the proposed turbines.
- As with Analogue Train Radio, wind turbines generally do not cause interference to GSM-R Train Radio signals, unless they are in close proximity to the transmitter. Field survey findings also indicate that there is no GSM-R network infrastructure currently installed in the vicinity of the Site.

Network Description	Comments	Wind Farm Impacts
Analogue Train Radio	Analogue Train Radio operates in the UHF band of frequencies. Transmitters in this band are generally not impacted by obstacles (e.g. wind turbine) unless the obstacle is less than 500m from the transmitter. The proposed wind farm is over 5 km from the analogue transmitter located at Claremorris train station. Also, at 5.1 km the proposed turbines are outside the 5 km Exclusion Zone (around the transmitter) as specified by Irish Rail.	No impacts
GSM-R	No GSM-R infrastructure observed in vicinity of proposed wind farm.	No impacts

Table 13. Irish Rail Network Impact Summary.

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APPENDIX A – Wind Farm Turbine Coordinates

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Appendix A – Wind Farm Turbine Co-ordinates

The turbine layout assessed in this Telecommunications Impact Study is provided below:

Turbine ID	Co-ordinates (WGS 84)	
	Latitude	Longitude
T01	53°44'43.58"N	9° 5'12.82"W
T02	53°44'54.56"N	9° 5'04.34"W
T03	53°44'47.55"N	9° 4'44.28"W
T04	53°44'54.35"N	9° 4'29.69"W
T05	53°44'41.33"N	9° 4'25.38"W
T06	53°45'1.88"N	9° 4'46.93"W
T07	53°45'8.89"N	9° 5'12.35"W

Table 14. Turbine Co-ordinates