Environmental Impact Assessment Report (EIAR)

Crumhach Wind Farm, Co. Sligo

Chapter 10 - Air Quality

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GLOSSARY OF TERMS

Term	Definition
CAFE Directive	The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive is a key European Union regulation designed to define, establish, and manage ambient air quality standards to protect human health and the environment. It sets legally binding limits for pollutants and dictates how Member States should monitor and improve air quality
IAQM 2024 Guidance	The IAQM 2024 guidance, "Guidance on the Assessment of Dust from Demolition and Construction," provides a standardized methodology for assessing construction dust impacts, covering demolition, earthworks, construction, and trackout.
Trackout	The transport of dust and dirt from the construction/ demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network.

GLOSSARY OF ACRONYMS

Acronym	Definition
NH_3	Ammonia
AER	Annual Environmental Report
C_6H_6	Benzene
BnM	Bord na Móna
CO_2	Carbon Dioxide
CO	Carbon Monoxide
CAFE	Clean Air for Europe
CEMP	Construction and Environmental Management Plan
DEFRA	Department of Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EEA	European Environmental Agency
HGVs	Heavy Goods Vehicles
HDV	Heavy-duty vehicle
IAQM	Institute of Air Quality Management
Km	Kilometres

Pb	Lead
LGVs	Light Goods Vehicles
LAQM	Local Air Quality Management
MRF	Materials Recovery Facility
m	metres
NIS	Natura Impact Statement
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NMVOC	Non-Methane Volatile Organic Compounds
OHL	Overhead Lines
O_3	Ozone
PM	Particulate Matter
ppb	parts per billion
PCAS	Peatland Climate Action Scheme
PAHs	Polyaromatic Hydrocarbons
SO_2	Sulphur Dioxide
SO_x	Sulphur Oxide
UKHA	UK Highways Agency
WHO	World Health Organisation

10. AIR QUALITY

10.1 Introduction

This chapter identifies, describes and assesses the potential significant direct and indirect effects on air quality arising from the construction, operation and decommissioning of the Proposed Project. The full description of the Proposed Project is detailed in Chapter 4: Description of the Proposed Project. Alternative designs initially proposed for the Proposed Project and their potential for effects on air quality are considered in Chapter 3: Site Selection and Reasonable Alternatives.

As detailed in Section 1.1.1 in Chapter 1: Introduction, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Site', 'Proposed Wind Farm', 'Proposed Turbines', 'Proposed Grid Connection Route', 'Existing Wind Farm' and 'Existing Grid Connection'. A detailed description of the Proposed Project is provided in Chapter 4 of this EIAR.

The assessment has been carried out according to best practice and guidelines relating to air quality.

10.1.1 Background

The Proposed Wind Farm is located on the northwest slopes of the Ox Mountains, located approx. 4.5km south of the village of Dromore West, and approx. 3km southwest of the village of Templeboy in Co. Sligo, at their nearest points.

The Proposed Wind Farm is accessed via the L6309 and L2702 Local Roads off the N59 National Road, travelling in an east-west direction north of the site and the N17 National Road, which runs in a north-south direction to the southeast of the site. The current entrance to the Existing Wind Farm will be upgraded as the main site entrance, utilising the existing access tr and infrastructure. Upgrades to additional existing site entrances along the L6309 and L2702 Local Roads and the provision of a new site entrance on the L2702 are proposed to access the adjoining lands.

Wind energy is an established land-use in the area of the Site. The Proposed Wind Farm encompasses the Existing Wind Farms, which are owned and operated by SSE. The Proposed Project will include the decommissioning of the Existing Wind Farm turbines, and their replacement with newer, more efficient turbines on the Existing Wind Farm and adjoining lands, in order to optimise the windtake resource of this area.

In addition to the Existing Wind Farm, land-cover on the Proposed Wind Farm primarily comprises peat bog, with coniferous forest to the north-west, east and south of the site. South of the Proposed Wind Farm comprises largely of transitional wood scrub, while land-use in the northern end of the site comprises largely of pastoral agriculture and low-density residential.

Current land-use along the Proposed Grid Connection Route comprise public road corridor, pastures, low density residential, industry, commercial forestry and land principally used for agriculture with significant areas of natural vegetation.

The townlands in which the Proposed Project is located are listed in Table 1-1 in Chapter 1: Introduction of this EIAR.

The production of energy from wind turbines has no direct air emissions as is expected from fossil fuel-based power stations. Harnessing more energy by means of renewable sources will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human

health and the environment. Some minor indirect emissions associated with the construction and decommissioning of the Proposed Project will include vehicular and dust emissions.

10.1.2 Statement of Authority

This section of the EIAR has been prepared by Brandon Taylor with input from Edel Mulholland and reviewed by Ellen Costello and Sean Creedon, all of MKO.

Brandon Taylor is a Project Environmental Scientist with over three years of private consultancy experience. Brandon holds a BSc (Hons) in Geography from McGill University, and a MSc (Hons) in Coastal & Marine Environments from the University of Galway. Brandon's key skills include scientific research and report writing, particularly in the context of local communities and their interactions with environmental stressors, and geospatial analysis and the application of GIS and remote sensing tools across fields of renewable energy development, coastal zone management and education and scientific communication. Since joining MKO, Brandon has been involved in the design and environmental impact assessment of multiple large-scale onshore wind energy developments across Ireland, contributing to and managing the production of EIA reports.

Edel Mulholand is an Environmental Scientist with MKO with over 1 year experience. Edel holds BA (Hons) in Environmental Science from the University of Galway. Prior to taking up her position with MKO in September 2024, Edel worked as an Environmental Chemistry Analyst with Complete Laboratory Solutions, Co. Galway, where she assisted with water quality analysis. Since joining MKO, Edel has assisted in the submission of several renewable energy developments. Edel's key strengths and areas of expertise are in environmental policy, drafting EIAR chapters, field work and QGIS mapping.

Ellen Costello is a Senior Environmental Scientist with MKO with over 6 years' experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a senior project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs.

This report has been reviewed by Sean Creedon (B.Sc., M.Sc.). Sean has 23 years' experience in planning and environmental impact elements within all stages of wind farm project delivery.

10.1.3 Relevant Guidance

The air quality section of this EIAR is carried out in accordance with the EIA Directive 2011/92/EU as amended by Directive 2014/52/EU and having regard, where relevant, to the best practice in Irish and international guidance listed below:

- Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document PE-ENV-01106 (Transport Infrastructure Ireland, December 2025)
- Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107 (Transport Infrastructure Ireland, December 2025).
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports – June 2022 (EPA, 2022).
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EC, 2017)

- Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects (EPA, 2021)
- Guidance of the Assessment of Dust from Demolition and Construction (IAQM, 2024).
- Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (TII, 2011).
- Guidelines for Assessment of Ecological Impacts of National Roads Schemes (TII, 2009).
- Clean Air Strategy for Ireland (Government of Ireland, 2023).
- UK Department of Environment Food and Rural Affairs (DEFRA) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM.TG (16) (DEFRA 2018).
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) – LA 105 Air Quality (UKHA, 2019).
- World Health Organization (WHO) Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulphur Dioxide Global Update 2021 (WHO 2021)

10.1.4 Relevant Legislation

In 1996, the Air Quality Framework Directive (on ambient air quality assessment and management) (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 (S.I. No. 33 of 1999). The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) addresses sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).
- The third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive (2004/107/EC), published in 2004, relates to polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air and was transposed into Irish law by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2009 (S.I. No. 58 of 2009) (amended by SI 659/2016 - Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016.)

The Air Quality Framework Directive and the first three Daughter Directives were replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC) on ambient air quality and cleaner air for Europe) (as amended by Directive EU 2015/1480) which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for PM2.5 (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM10) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 10-1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre (µg/m^3) and parts per billion (ppb). The notation PM_{10} is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. $PM_{2.5}$ represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) as amended by the Air Quality Standards (Amendments) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2016 (S.I. 659 2016). The 2011 Regulations superseded the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the Ambient Air Quality Assessment and Management Regulations 1999 (S.I. No. 33 of 1999). The Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) was revoked on 31 December 2022 and has been replaced by the Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022).

On the 26th of October 2022 the EU Commission announced a proposed review of Air Quality Standards.[1] The proposed revision will set interim 2030 EU air quality standards, seeking to align more closely with WHO recommendations, while putting the EU on a trajectory to achieve zero pollution for air at the latest by 2050, in synergy with climate-neutrality efforts. The first review is proposed to take place by the end of 2028, with the objective of ensuring full alignment with WHO recommendations.

The Ambient Air Quality Standards Regulation (2022) made the provisions necessary for the implementation of Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (as amended), establishes the limit values and alert thresholds for concentrations of certain pollutants in ambient air, provides for the assessment of concentrations of certain pollutants in ambient air, provides for the maintenance of ambient air quality, and ensures that adequate information on concentrations of pollutants are made available to the public.

On 10 December 2024, Directive (EU) 2024/2881 on ambient air quality and cleaner air for Europe came into force. This directive recasts Directive 2008/50/EC (the CAFE Directive) and the fourth Daughter Directive (Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air) and incorporates them into a single directive. This recast directive sets out limit values, target values, average exposure reduction obligations, average exposure concentration objectives, critical levels, alert thresholds, information thresholds and long-term objectives. It sets out air quality provisions with the aim of achieving the objectives of the European Commission's Zero Pollution Action Plan, so that air pollution within the EU is progressively reduced to levels no longer considered harmful to health and natural ecosystems at the latest by 2050. At the time of writing Directive (EU) 2024/2881 has not yet been transposed into Irish law.

The Proposed Project offers an important opportunity to further utilise Ireland's abundant renewable energy resources, delivering valuable improvements to air quality and, consequently, to human health.

10.1.5 Air Quality Standards

The Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022) remains aligned to the CAFE Directive and diverts to the CAFE Directive for the Limit values outlined in Table 10-1, the Assessment Thresholds in Table 10-2, the Ozone limits and Assessment Thresholds in Table 10-3 and Table 10-4 respectively.

[1] *European Commission, Revision of the Ambient Air Quality Directives.* <https://environment.ec.europa.eu/topics/air/air-quality/revision-ambient-air-quality-directives_en>

Table 10-1 Limit Values of the CAFÉ Directive 2008/50/EC (Source: https://airquality.ie/information/air-quality-standards)

Pollutant	Limit Value Objective	Averaging Period	Limit Value (ug/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of human health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005
Particulate matter 10 (PM_{10})	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015

Particulate matter 2.5 ($PM_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020
Lead	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded	1st Jan 2005
Benzene	Protection of human health	Calendar year	5	1.5	Annual mean	1st Jan 2010

Table 10-2 Assessment Thresholds from CAFE Directive 2008/50/EC

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu g/m^3$)	Basis of Application of Limit Value
Sulphur dioxide (SO_2)	Upper assessment threshold for the protection of Human Health	24 hours	75	Not to be exceeded more than 3 times in a calendar year
Sulphur dioxide (SO_2)	Lower assessment threshold for the protection of human health	24 hours	50	Not to be exceeded more than 3 times in a calendar year
Nitrogen dioxide (NO_2)	Upper assessment threshold for the protection of human health	1 hour	140	Not to be exceeded more than 18 times in a calendar year
Nitrogen dioxide (NO_2)	Lower assessment threshold for the protection of human health	1 hour	100	Not to be exceeded more than 18 times in a calendar year
Particulate matter 10 (PM_{10})	Upper assessment threshold	24 hours	35	Not to be exceeded more than 35 times in a calendar year
Particulate matter 10 (PM_{10})	Lower assessment threshold	24 hours	25	Not to be exceeded more than 35 times in a calendar year
Lead (Pb)	Upper assessment threshold	Calendar Year	0.35	-

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu g/m^3$)	Basis of Application of Limit Value
Lead (Pb)	Lower assessment threshold	Calendar Year	0.25	-
Carbon Monoxide (CO)	Upper assessment threshold	8 hours	7000	-
Carbon Monoxide (CO)	Lower assessment threshold	8 hours	5000	-
Benzene (C_6H_6)	Upper assessment threshold	Calendar Year	3.5	-
Benzene (C_6H_6)	Lower assessment threshold	Calendar Year	2	-

Ozone is set out differently in the CAFE Directive in that it sets target values and long-term objectives for ozone rather than limit values. Table 10-3 presents the target values and long-term target value for ozone and Table 10-4 details the threshold values for Ozone.

Table 10-3 Target values for Ozone defined in Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Long- term Objective
Protection of human health	Maximum daily 8-hour mean	120 $\mu g/m^3$ not to be exceeded more than 25 days per calendar year averaged over 3 years	120 $\mu g/m^3$
Protection of vegetation	AOT40* calculated from 1-hour values from May to July	18,000 $\mu g/m^3.h$ averaged over 5 years	6,000 $\mu g/m^3.h$

* AOT40 is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 µg/m3 and is expressed as µg/m3 hours.

Table 10-4 Threshold for Ozone Defined in Directive 2008/50/EC (source: https://airquality.ie/information/air-quality-standards and Directive 2008/50/EC)

Pollutant	Averaging Period	Threshold
Information Threshold	1-hour average	180 $\mu g/m^3$
Alert Threshold	1-hour average	240 $\mu g/m^3$

10.1.5.1 Air Quality and Health

In September 2025 the EPA published '*Air Quality in Ireland 2024*'[2] which reports that although air quality in Ireland is generally good and on track to meet the majority of 2030 EU Commitments for

[2] *Environmental Protection Agency (2025) Air Quality in Ireland 2024.* <https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2024.php>

national emission levels, there are concerning localised issues. Fine particulate matter (PM2.5) from solid fuel combustion and nitrogen dioxide (NO2) from vehicle emissions are the main pollutants. People's health and the health of our environment is impacted by these pollutants. Irelands most recent air quality measures in 2024 show that Ireland is meeting the legal limits set by the EU, however Ireland is not meeting the stricter health guidelines from the WHO and are currently falling behind on targets set in the Clean Air Strategy for Ireland out to 2026 (Section 10.1.5.1.1 below). Ireland's ambition in the 'Clean Air Strategy for Ireland' is to move towards alignment with the WHO Air Quality guidelines, this will be challenging but will have a significantly positive impact on health.

The European Environmental Agency (EEA) Report, '*Air Quality in Europe 2022*'[3] report highlights the negative effects of air pollution on human health. The report assessed that poor air quality in Europe accounted for premature deaths of approximately 238,000 people in the 27 EU Member States in 2020. In 2020 in the European Union, 96% of the urban population was exposed to levels of fine particulate matter above the health-based guideline level set by the World Health organisation. Furthermore, in 2020 damaging levels of nitrogen deposition to ecosystems were exceeding in 75% of the total ecosystems that are in the EU-27. This represents a fall of 12% since 2005. The estimated effects on the population in Europe of exposure to NO_2 and O_3 concentrations in 2020 were around 49,000 and 24,000 premature deaths, respectively. From this, 490 Irish deaths were attributable to fine particulate matter ($PM_{2.5}$), 50 Irish deaths were attributable to nitrogen oxides (NO_2), and 70 Irish deaths were attributable to Ozone (O_3). These figures are further informed by the EEA publication of 'Ireland – air pollution country fact sheet 2024' on the 10th December 2024[4]. This states that 530 Irish deaths were attributable to fine particulate matter ($PM_{2.5}$), 100 Irish deaths were attributable to nitrogen oxides (NO_2), and 240 Irish deaths were attributable to Ozone (O_3).

The Office of Energy Efficiency and Renewable Energy in the United States published an article on August 21, 2024, entitled '*How Wind Can help Us Breathe Easier*.'[5] This article details the carbon dioxide (CO_2) emissions from different energy sources over the entire lifespan of the technology. It was found that wind energy produces around 11 grams of CO2 per kilowatt-hour (g CO_2/kWh) of electricity generated, compared with about 980g CO_2/kWh for coal and roughly 465g CO_2/kWh for natural gas. That makes coal's carbon footprint almost 90 times larger than that of wind energy, and the footprint of natural gas more than 40 times larger. During combustion of high-emitting energy sources, other air pollutants, i.e., nitrogen oxides (NOx) and sulphur dioxide (SO_2), are also released into the atmosphere. This results in the emission of pollutants that can cause adverse health effects, including asthma, bronchitis, lower and upper respiratory symptoms, and heart attacks. Air pollution is responsible for a large number of premature deaths relating to these illnesses.

The EEA published a briefing on '*Europe's Air Quality Status*' in April 2025[6]. This briefing presented the status of concentrations of pollution in ambient air in 2022 and 2023 for regulated pollutants in relation to both EU air quality standards and the 2021 WHO guideline levels. The assessment shows that, in spite of constant improvements, exceedances of air quality standards are common across the EU, with concentrations well above the latest WHO recommendations. These emissions, along with others including sulphur oxides (SO_x) are produced during fossil fuel-based electricity generation in various amounts, depending on the fuel and technology used, emissions from industry and power plants, vehicles emissions and transport fuels.

Key messages outlined in the '*Air Quality Status Report 2025*' are detailed below:

[3] *European Environment Agency (EEA) (2022). Air Quality in Europe 2022 Report <https://www.eea.europa.eu/publications/air-quality-in-europe-2022>*
[4] *European Environment Agency (EEA). (2024). Ireland – Air Pollution Country Fact Sheet 2024. <https://www.eea.europa.eu/en/topics/in-depth/air-pollution/air-pollution-country-fact-sheets-2024/ireland-air-pollution-country-fact-sheet-2024>*
[5] *Office of Energy Efficiency and Renewable Energy (2024) How Wind Can Help Us Breathe Easier < https://www.energy.gov/eere/wind/articles/how-wind-can-help-us-breathe-easier>*
[6] *Europe's air quality status 2024 briefing. <https://www.eea.europa.eu//publications/europes-air-quality-status-2024>*

- EU air quality standards are still not fully met across Europe, despite ongoing overall improvements.
- Since 2011, all countries have reduced exposure of their urban population to fine $PM_{2.5}$ particles, the most harmful pollutant from a health perspective. Nevertheless, the vast majority (94%) of the EU urban population remains exposed to $PM_{2.5}$ concentrations above the World Health Organization guideline level, highlighting the need for additional measures to reduce the associated health risks.
- Many locations already have air quality concentrations below the new EU 2030 standards. But in order to meet these new standards everywhere, and based on current progress, additional measures to improve air quality, especially in cities, are likely to be needed.

A 2024 EPA report *'Ireland's State of the Environment Report'* [7] states that the pollutants of most concern are Fine Particulate matter ($PM_{2.5}$.), Nitrogen Dioxide (NO_2) and Ammonia (NH_3). The EPA 2024 report goes on to state that:

> *"The planned transition to more renewable energy sources, and away from combustion-sourced heating systems to electrification, is a shift that could see greenhouse gas emissions from industry significantly decrease.*
>
> *As a consequence of meeting these growing demands primarily with oil, natural gas, coal and peat, our energy system is highly dependent on fossil fuels. Ireland has made some progress in transforming the electricity system through the deployment of wind farms, with renewable energy currently providing more than 40% of electricity used. However, electricity represents only one-fifth of Ireland's energy use, and our transport and heating systems remain heavily reliant on fossil fuel systems, with lock-ins that need to be addressed.*
>
> *While Ireland's renewable energy share has increased from 10.7% in 2018 (reported in the last State of the Environment Report) to 13.1% in 2022, this is the lowest level in the EU (well below the EU average of 23.0%), and Ireland is not on track to meet the EU-wide binding target of 42.5% renewable energy share by 2030. Reaching the target of 80% renewable electricity by 2030, while ensuring a stable energy supply, will require new capacity, a more flexible grid and increased interconnectivity (EC, 2024)*
>
> *Established technologies, such as wind energy, solar photovoltaics and bioenergy, will be key in meeting short-term emission reduction targets (i.e. 2030), whereas significant growth in offshore wind infrastructure is expected to be the key essential element of future energy systems."*

The EPA published a report, entitled '*Ireland's Air Pollutant Emissions 1990-2030*' in May 2025 providing details of emissions of air pollutants in Ireland in the period 1990 to 2023 and projected emissions of these pollutants for 2030[8]. The key findings of the report with respect to assessment of targets are:

- Ireland is compliant with current and future emission reduction commitments for ammonia (NH3), non-methane volatile organic compounds (NMVOC), sulphur dioxide (SO2), nitrogen oxides (NOx) and fine particulate matter (PM2.5)
- Ammonia emissions are projected to be in compliance out to 2030
- An adjustment to NMVOC emissions is required in order to meet the required emission reduction commitment made in 2023.

[7] *Environmental Protection Agency (2024). Irelands State of the Environment Report 2024)* <https://www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/state-of-environment-report-/>
[8] *Environmental Protection Agency (EPA). (2025). Ireland's Air Pollutant Emissions 1990–2030.* <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Air-Pollutant-Final-Report.pdf>

The Proposed Project therefore represents an opportunity to further harness Ireland's significant renewable energy resources, with valuable benefits to air quality and in turn to human health. The consumption of fossil fuels for energy results in the release of particulates, sulphur dioxide and nitrogen dioxide to the air. The use of wind energy, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, results in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2), thereby resulting in cleaner air and associated positive health effects.

Whilst there is the potential for such emissions to be generated during the construction, operational and decommissioning phases of the Proposed Project, mitigation measures will be implemented at this Site to reduce the impact from dust and vehicle emissions, which are discussed in Section 10.3 below.

10.1.5.1.1 *Clean Air Strategy Ireland 2023*

Ireland's Clean Air Strategy 2023[9] sets out the detail of seven strategic frameworks that will be used to ensure that air quality continues to improve (Figure 10-1). The aims of these key strategic frameworks are:

- To set the appropriate targets and limits to ensure continuous improvements in air quality across the country and to deliver health benefits for all.
- To ensure the integration of clean air considerations into policy development across Government.
- To increase the evidence base that will help Ireland to continue to evolve it's understanding of the sources of pollution and their impacts on health, in order to address them more effectively.
- To enhance regulation required to deliver improvements across all pollutants.
- To improve the effectiveness of our enforcement systems.
- To promote and increase awareness of the importance of clean air, and the links between cleaner air and better health.
- To develop the additional targeted/specific policy measures as required to deal with national or local air quality issues.

Since the publication of the Clean Air Strategy 2023, the Clean Air Strategy for Ireland '*First Progress Report* 2024' was released. This report detailed the significant progress that has been made on the actions in the strategy since its publication in April 2023. The key takeaways that have been implemented since the publication of the strategy include the operational use of the Air Pollution Act 1987 (Solid Fuels), please note, while it is too early to say the exact impact that these regulations have had on air quality, initial indications from the EPA are that there have been significant air quality improvements made in areas prone to burning solid fuels. The Clean Air Strategy saw a push for the submission of Ireland's second National Air Pollution Control Programme, which was completed in May 2024, and the development of new public awareness campaigns. The Clean Air Strategy has furthermore increased the frequency and financial supports given to local authorities to conduct sulphur testing[10].

[9] *Rialtas na hÉireann Clean Air Strategy April 2023. Available at: https://www.gov.ie/en/publication/927e0-clean-air-strategy/#:~:text=The%20Clean%20Air%20Strategy%20provides,delivering%20on%20wider%20national%20objectives.*
[10] *Clean Air Strategy For Ireland First Progress Report 2024 . Available at: https://assets.gov.ie/static/documents/clean-air-strategy-for-ireland-first-progress-report.pdf*

Figure 10-1 Seven Strategic Frameworks for Air Quality, with associated chapters in brackets. Reproduced as Figure 1 from Clean Air Strategy 2023

Chapter 11 of the Clean Air Strategy discusses Air Quality Policy Development. The chapter discusses energy policy and acknowledges how the State's accelerated transition to renewable electricity will be critical to successfully meeting the ambitious renewable energy and greenhouse gas emission reduction targets outlined in the European Green Deal and Ireland's Climate Action Plan 2025, as well as to protecting against security of supply risks and removal of fossil fuels from power generation. Wind (offshore and onshore) and solar energy will be the leading cost-effective technologies to achieve our energy and emissions targets, as well as displacing emissions in other sectors, including household heating and vehicle transport. In the Clean Air Strategy, Climate Action Plan 2023 is referenced, while Climate Action Plan 2025 is currently the latest revision. The targets of the Climate Action Plan 2025 and the European Green Deal are to deliver net-zero greenhouse gas emissions by 2050 and reduce greenhouse gas emissions to at least 55% by 2030, compared to 1990 levels.

The Proposed Project supports Ireland's Clean Air Strategy generating clean wind energy and facilitating the connection of this clean energy to the national grid, thus helping to cut air pollution, improve public health, and meet national air and climate goals.

10.1.6 Methodology

The assessment of the development footprint of the Proposed Project, within this EIAR Chapter, is based on the maximum potential footprint for all of the infrastructural elements (see Chapter 1 Section 1.7.3 for details on assessment of turbine parameter range). This precautionary approach is taken as the assessment of the maximum development footprint will, in the absence of mitigation measures, give rise to the greatest potential for significant effects. Should the development footprint be less than the maximum, the potential for significant effects will also be reduced.

10.1.6.1 Air Quality Zones

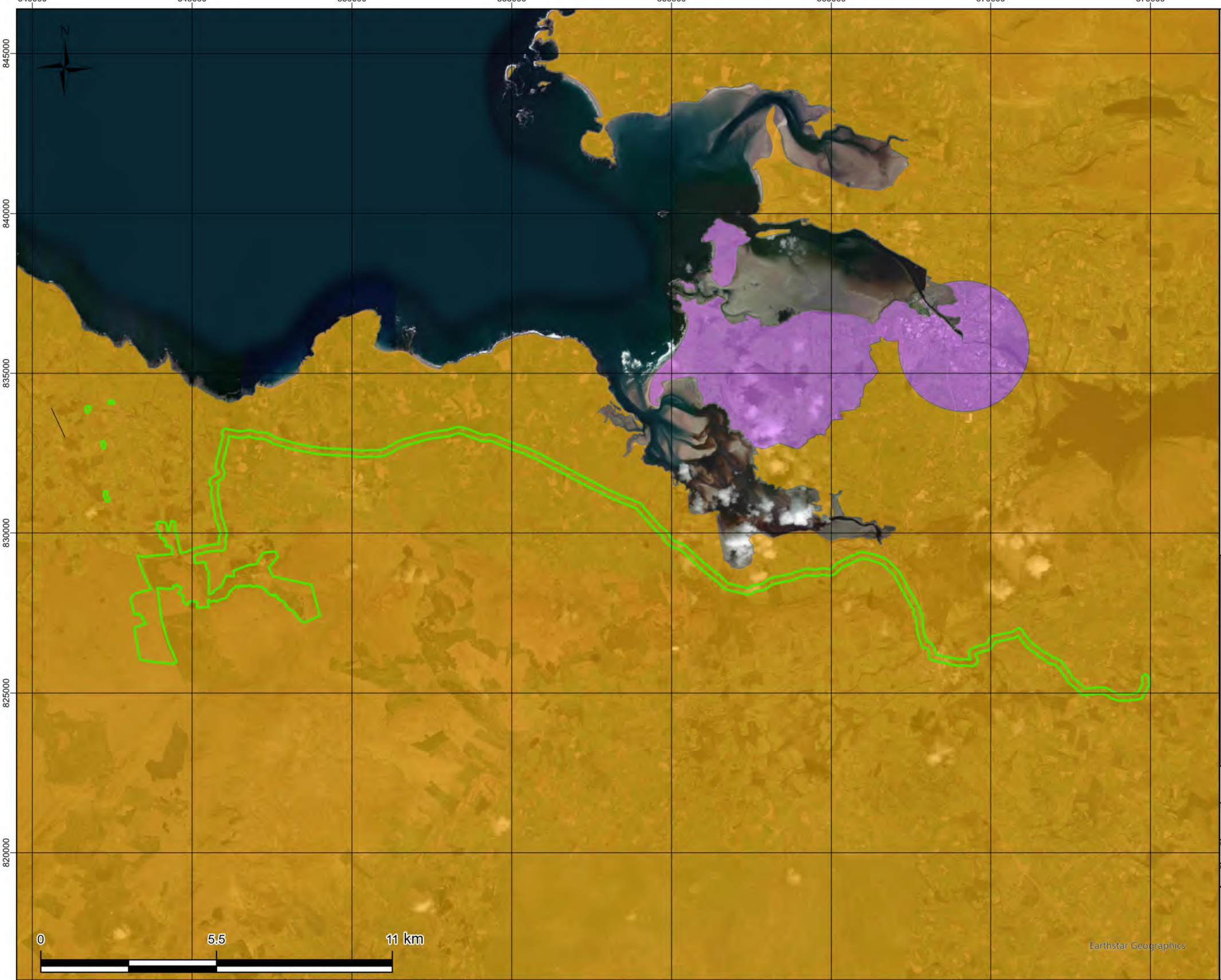
The air quality zone for the Site was determined following a desktop assessment and site visit which confirmed the rural setting to the area within which the Proposed Project is located. This work was supplemented by a review of EPA collated baseline air quality data namely Sulphur Dioxide (SO_2), Particulate Matter (PM_{10}), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO) and Ozone (O_3) for the

selected air quality zone to determine the representative levels of such emissions for the Proposed Project.

The EPA has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and Environs
- Zone B: Cork City and Environs
- Zone C: 16 urban areas within population greater than 15,000
- Zone D: Remainder of the country

These zones were defined to meet the criteria for air quality monitoring, assessment and management as described in the CAFE Directive. The Proposed Project lies within Zone D, see Figure 10-2, which represents rural areas located away from large population centres.



Map Legend

EIAR Site Boundary

AirZone

ZoneC

ZoneD

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

SITE LOCATION - NOT TO SCALE

Drawing Title

Air Quality Zones surrounding the Proposed Project

Project Title

Crumhach Wind Farm, Co. Sligo

Project No.	Drawing No.	Scale
230841	10-2	1:110,000
Drawn By	Checked By	Date
EM	BT	07/05/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

10.1.6.2 Air Quality Data Review

The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The most recent report on air quality in Ireland, *'Air Quality in Ireland 2024'* was published by the EPA in 2025[11]. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D. These are detailed in the Baseline Air Quality section.

10.1.6.3 Dust

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*'[12](2024) (hereafter referred to as 'IAQM 2024 Guidance') was considered in the dust impact assessment. The guidance document outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. This methodology has been used to predict the likely risk of dust as a result of the construction phase works operational phase activities and decommissioning phase. The use of IAQM 2024 Guidance is considered best practice in the absence of applicable Irish guidance. The major dust generating activities are divided into four types within the IAQM 2024 Guidance to reflect their different potential impacts. These are:

- Demolition (There are no demolition works required for any phase of the Proposed Project)[13];
- Earthworks;
- Construction;
- Trackout[14]

The magnitude of dust generating activities is divided into 'Large', 'Medium' or 'Small' scale depending on the nature of the activities involved. IAQM 2024 Guidance provides example definitions for the scale of the activities, and these are applied for this development as outlined in Table 10-5.

Table 10-5 Description of magnitude for nature of activities

	Large	Medium	Small
Demolition	Total building volume >75,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12 m above ground level	Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material, demolition activities 6-12m above ground level	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months

[11] *Environmental Protection Agency: Air Quality in Ireland 2023. Available at: https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2024.php?utm_source=linkedin&utm_medium=social&utm_campaign=reports&utm_content=ap_guodyoblzz*

[12] *IAQM (2024) Guidance on the Assessment of Dust from Demolition and Construction. Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf*

[13] *As identified in Section 1.1.1 of Chapter 1 the removal of the Existing Wind Farm turbines is considered under the construction phase of the proposed but not considered demolition in the context of the Proposed Project. Turbine removal is therefore considered under construction / trackout.*

[14] *The transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when Heavy Goods Vehicles (HGVs) and/or Heavy Duty Vehicles (HDVs) leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when HGVs/HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.*

	Large	Medium	Small
Earthworks	Large: Total site area >110,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height	Total site area 18,000 m^2 – 110,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3m - 6m in height	Total site area <18,000 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height
Construction	Total building volume >75,000 m^3, on site concrete batching, sandblasting	Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout	>50 HDV* (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m
	Note: A vehicle movement is a one-way journey. i.e. from A to B and excludes the return journey. HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average. **A HDV is a heavy-duty vehicle with a gross weight greater than 3.5 tonnes*		

The earthwork requirements as outlined in Appendix 4-2, Peat and Spoil Management Plan, of this EIAR results in the classification of the Proposed Wind Farm as 'Large' for Earthworks and Construction activities. The Proposed Grid Connection Route falls under the classification of 'Small' for Earthworks and Construction due to the lower volumes of construction material required. The number of HDV movements per day, as outlined in Section 15.1.4.2 in Chapter 15: Material Assets of this EIAR, results in the classification of the Proposed Wind Farm as 'Large' and Proposed Grid Connection Route as 'Medium' for Trackout activities.

The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities.

10.1.6.3.1 *Defining the Sensitivity of the Area*

For the purposes of this assessment, high sensitivity receptors are residential properties and dust sensitive ecological habitats. This assessment will consider high sensitivity receptors such as residential properties, hospitals, schools and residential care homes separately to high sensitivity ecological habitats. Commercial properties and places of work are regarded as medium sensitivity while low

sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity[15].

The IAQM 2024 Guidance has outlined three types of effects to be considered:

- Sensitivities of People to Dust Soiling Effects
- Sensitivities of People to the Health Effects of PM_{10}
- Sensitivities of Receptors to Ecological Effects

Sensitivities of People to Dust Soiling Effects

Dust soiling effects can occur for a distance of 250m from works areas, but the majority of deposition occurs within the first 50m (IAQM, 2024). Table 10-6 below identifies the sensitivity of an area to dust soiling effects on people and their properties, relative to different receptor sensitivities.

Table 10-6 Sensitivity of the Area to Dust Soiling Effects on People and Property. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Sensitivities of People to the Health Effects of PM_{10}

When assessing sensitivity of people to the health effects of PM_{10}, the IAQM 2024 Guidance recommends the use of sensitivities bands based on whether or not the receptor is likely to be exposed to elevated concentrations of PM_{10} over a 24-hour period. Table 10-7 below identifies the sensitivity of an area to human health effects of PM_{10}, relative to different receptor sensitivities. As indicated in Section 10.1.6.1 above, the Proposed Project is situated in Zone D. According to the 2021 EPA baseline air quality data[16]; the average PM_{10} for Zone D is 14µg/m^3. Therefore, the only annual PM_{10} concentration categorised in the IAQM 2024 Guidance relevant to the Proposed Project is the minimum concentration of <24µg/m^3.

Table 10-7 Sensitivity of the Area to Human Health Impacts. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Annual Mean PM_{10} concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	>32 µg/m^3	>100	High	High	High	Medium

[15] *Please see Section 7.3 (pg. 18) of the 2024 IAQM Guidance on the assessment of dust from demolition and construction (https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf) for full definitions of high, medium, and sensitive receptors for each of the three types of effects being considered*

[16] https://www.epa.ie/resources/charts--data/air/air-quality--pm10.php

Receptor Sensitivity	Annual Mean PM_{10} concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 $\mu g/m^3$	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 $\mu g/m^3$	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 $\mu g/m^3$	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 $\mu g/m^3$	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 $\mu g/m^3$	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 $\mu g/m^3$	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 $\mu g/m^3$	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Sensitivities of Receptors to Ecological Effects

Dust deposition due to Earthworks, Construction and trackout has the potential to physically and chemically affect sensitive habitats and plant communities. Table 10-8 below identifies the sensitivity of an area to ecological impacts.

Table 10-8 Sensitivity of the Area to Ecological Impacts. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Distance from source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

- There are 8 no. ecological receptor and habitats within the Site which as described by the IAQM 2024 Guidance which may be sensitive to dust. This ecologically sensitive habitat and its sensitivity designation is listed below:
  - Annex 1 Habitat, Active Blanket Bog – High sensitivity.
  - Annex 1 Habitat, Northern Atlantic Wet Heaths with *Erica tetralix* – High sensitivity.
  - Cutover Bog (PB4) – Medium sensitivity.
  - Ox Mountains Bogs pNHA/SAC - High Sensitivity
  - Dunneill River pNHA– Medium Sensitivity
  - Easky River pNHA - Medium Sensitivity
  - Unshin River pNHA/SAC - High Sensitivity
  - Ballysadare Bay pNHA/SAC/ SPA- Medium Sensitivity
- The Proposed Grid Connection Route involves 33 no. watercourse crossings (31 no. EPA), including the crossing of the Owenmore River, Arnaglass River, and Unshin River, all of which have a Medium sensitivity to dust.

The above identified sensitive ecological receptors have been assessed within Chapter 6: Biodiversity, Chapter 9: Hydrology and Hydrogeology, and the Natura Impact Statement (NIS). These receptors sensitivity to dust are assessed below in Section 10.3.2.2.

10.1.6.3.2 Defining the Risk of Impacts

The dust emission magnitude is combined with the sensitivity of the area to determine the risk of impacts with no mitigation applied. The matrix in Table 10-9 provides a method of assigning the level of risk for each activity.

Table 10-9 Risk of Dust Impacts – Earthworks, Construction, and Trackout (IAQM, 2024)

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

EPA classification terminology as presented in Table 1-2 of Chapter 1 of this EIAR (and in Table 10-10 below) have been correlated with the equivalent risk rating from Table 10-9 above.

Table 10-10 Correlation of Impact Classification Terminology (EPA, 2022) to Risk Rating

EPA Term	EPA Description	Risk Rating
Imperceptible	An effect capable of measurement but without significant consequences	Negligible
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities	Low
Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends	Medium
Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment	High

The risk of dust impacts for the Earthworks, Construction and Trackout activities from the Proposed Project is set out in Section 10.3.2.2 below.

10.2 Baseline Air Quality

The air quality in the vicinity of the Site is typical of that of rural areas in the west of Ireland, i.e., Zone D. Prevailing south-westerly winds carry clean, unpolluted air from the Atlantic Ocean onto the Irish mainland. The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The most recent report on air quality in Ireland, '*Air Quality in Ireland 2024*' was published by the EPA in September 2025. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D. These are detailed in the following tables.

10.2.1.1 Sulphur Dioxide (SO_2)

The Sulphur dioxide data from Cork Harbour, Kilkitt, Askeaton and Edenderry in 2024 is presented in Table 10-11.

Table 10-11 Sulphur Dioxide (SO_2) Data for Zone D Sites in 2024

Parameter	Measurement (ug/m³)
Annual Mean	2.8 µg/m^3
Hourly values > 350	0
Hourly max (Average)	36.2 µg/m^3
Daily values > 125	0
Daily max (Average)	14.7

During the EPA monitoring period there were no exceedances of the daily limit values for the protection of human health. As can be observed from Table 10-11 the average maximum hourly value recorded during the assessment period was 36.2 µg/m^3. In addition, there were no exceedances of the annual mean limit for the protection of ecosystems. It is expected, based on professional judgement and the rural setting within which the Site is located, that SO_2 values at the Site are similar or lower than those recorded for the Zone D sites above.

10.2.1.2 Particulate Matter (PM_{10})

Sources of particulate matter include vehicle exhaust emissions, dust from soil and road surfaces, construction works and industrial emissions. The '*Air Quality in Ireland 2024'* report provides annual mean PM_{10} concentration for nineteen Zone D towns: Tipperary Town, Roscommon Town, Malin Head, Macroom, Longford, Kilkitt, Killarney, Ballinasloe, Enniscorthy, Edenderry, Mallow, Cobh Carrignafoy, Claremorris, Cavan, Castlebar, Carrick-on-Shannon, Carnsore, Askeaton and Birr. Particulate matter (PM_{10}) data for 2024 is presented in Table 10-12.

Table 10-12 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2024

Parameter	Measurement (ug/m3)
Annual Mean	11.5 µg/m^3
% Data Capture (Average)	94.0%
Values > 50 ug/m^3	Max 7 (Longford)
Daily Max (Average)	49.5 µg/m^3

The daily limit of 50 µg/m^3 for the protection of human health was exceeded on 40 days, which is greater than the PM_{10} daily limit for the protection of human health of a max 35 days >50 µg/m^3 applicable from 2005. The greatest number of exceedances occurred at Longford where the PM_{10} daily limit was exceeded on 7 no. occasions. In the *'Air Quality in Ireland 2024'* report, it notes that there were breaches in the levels of particulate matter (PM), which in Ireland, mainly comes from the burning of solid fuel, such as coal, peat, and wood to heat our homes. In accordance with the Air Quality Zones data (Section 10.1.6.1) and Baseline Air Quality information detailed above, it is expected, based on professional judgement and the rural setting within which the site is located, that PM_{10} values at the Site is similar or lower than those recorded for the Zone D sites above.

10.2.1.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide data for Emo Court, Birr, Castlebar, Carrick-on-Shannon, Kilkitt, Mallow and Edenderry in 2024 is presented Table 10-13.

Table 10-13 Average Nitrogen Dioxide Data for Zone D Sites in 2024

Parameter	Measurement
Annual Mean (Average)	8.3 µg/m^3
NO_2 Values >200	0
Values > 140 (UAT)	0
Values >100 (LAT)	1
Hourly Max. (Average)	68.6 µg/m^3

The annual NO_2 value was below the annual mean limit value for the protection of human health of 40 µg/m^3. The lower assessment threshold of 100 µg/m3 was exceeded once during the monitoring period in Edenderry, Co. Offaly while the upper assessment threshold of 140 µg/m3 was not exceeded during the monitoring period. The 18 day limit was not exceeded during the monitoring period. In 2024, no other monitoring locations in Zone D had exceedances in the lower and upper assessment thresholds of 100 and 140 µg/m3. The average hourly max. NO_2 value of 68.6 µg/m^3 measured during the monitoring

period was below the hourly max threshold of 200 µg/m^3. It is expected, based on professional judgement, that NO_2 values at the Site is similar or lower than those recorded for the Zone D sites above.

10.2.1.4 Carbon Monoxide (CO)

Due to operational issues at the Birr station, there is no 2024 data. The baseline air quality will use the 2023 data. The '*Air Quality in Ireland 2023*'[17] report provides rolling 8-hour carbon monoxide concentrations for Birr, a Zone D site. Carbon Monoxide data for 2023 is presented in Table 10-14.

Table 10-14 Carbon Monoxide Data for Birr – Zone D Site in 2023

Parameter	Measurement
Annual Mean	0.6 mg/m^3
Median	0.6 mg/m^3
% Data Capture	99.8%
Values > 10	0
Max	2.2 mg/m^3

The average concentration of carbon monoxide was 0.6 mg/m^3. The carbon monoxide limit value for the protection of human health is 10,000 µg/m^3 (or 10 mg/m^3). On no occasions were values in excess of the 10 mg/m^3 limit value set out in Directive 2008/50/EC. It is expected, based on professional judgement and the rural setting within which the site is located, that CO values at the Site are similar or lower than those recorded for the Zone D site above.

10.2.1.5 Ozone (O_3)

The '*Air Quality in Ireland 2024*' report provides rolling 8-hour ozone concentrations for eight Zone D sites: Emo Court, Kilkitt, Carnsore Point, Mace Head, Castlebar, Cork Mallow, Valentia and Malin Head. Ozone (O_3) data for 2024 is presented in Table 10-15. As can be observed from Table 10-15 there were no exceedances of the maximum daily eight-hour mean limit of 120 µg/m^3. The CAFE Directive stipulates that this limit should not be exceeded on more than 25 days per calendar year averaged over 3 years. It would be expected, based on professional judgement and the rural setting within which the Site is located, that O_3 values at the Site would be similar or lower than those recorded for the Zone D sites below.

Table 10-10-15 Average Ozone Data for Zone D Sites in 2024.

Parameter	Measurement
Annual Mean	58.9 µg/m^3
Median	59.9 µg/m^3
% Data Capture	84.1%
No. of days > 120 µg/m^3	0 days

[17] *Air Quality in Ireland Report 2023. Available at: https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2023.php*

10.2.1.6 Dust

There are no statutory limits for dust deposition in Ireland. However, EPA guidance suggests that a deposition of 10 mg/m^2/hour can generally be considered as posing a soiling nuisance. This equates to 240 mg/m^2/day. The EPA recommends a maximum daily deposition level of 350 mg/m^2/day when measured according to the German TA Luft Standard 2002. This limit value can also be implemented with regard to dust impacts from construction activities associated with the Proposed Project.

The extent of dust generation at any site depends on the type of activity undertaken, the location, the nature of the dust, i.e., soil, sand, etc., and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or periods of dry weather. Construction dust has the potential to be generated from on-site activities such as excavation and backfilling. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

The potential dust-related effects on local air quality and the relevant associated mitigation measures during the construction, operational and decommissioning phases of the Proposed Project are presented in Sections 10.3 below.

10.3 Likely and Significant Impacts and Associated Mitigation Measures

10.3.1 'Do-Nothing' Scenario

An alternative land use option to repowering the Existing Wind Farm as part of the Proposed Project would be to leave the Existing Wind Farm as it is, with no changes made to the existing operating 23 no. wind turbines within the Existing Wind Farm. In doing so, environmental effects in terms of emissions are likely to be neutral for the short term, however 13 no. of the existing turbines (existing Dunneill Wind Farm) are due to be decommissioned in accordance with their planning permissions in 2039. Once the 13 no. turbines are decommissioned, there will be a negative effect on greenhouse gas emissions. The 10 no. turbines which were commissioned in 2003 will be left in situ (existing Kingsmountain Wind Farm). However, these machines are aging and are not as efficient as the newer machines. Although these turbines do not have a decommissioning date, they will eventually have to be decommissioned. The opportunity to continue capturing the available renewable energy resource with the Existing Wind Farms would be lost.

An alternative land use option to developing a renewable energy project in the greenfield sections of the Proposed Wind Farm (i.e. areas of the Proposed Wind Farm located outside the footprint of the Existing Wind Farm) would be to leave the area as it is with no changes made to the current land use practices of commercial forestry, turf cutting, and public road corridor.

In implementing the 'Do-Nothing' alternative, however, the opportunity to capture a significant part of Co. Sligo's renewable energy resource would be missed, as would the opportunity to contribute to meeting Government and EU 2030 targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. In addition, the opportunity to meet the obligations as laid out in the Climate Action and Low Carbon Development Act 2021 will be lost. The opportunity to generate local employment, development contributions, and rates would also be forgone. Furthermore, the opportunity to implement the measures outlined in the Biodiversity Management and Enhancement Plan (BMEP) as outlined in Appendix 6-4 would also be lost.

10.3.2 Construction Phase

Within this section, the impact will consider the Proposed Project i.e. both the Proposed Wind Farm and the Proposed Grid Connection Route, as a whole. Where the Proposed Wind Farm and the

Proposed Grid Connection Route are required to be considered separately, this is identified within the assessment.

10.3.2.1 Exhaust Emissions

Pre-Mitigation Impact

Proposed Wind Farm

Exhaust emissions associated with vehicles and plant such as NO_2, Benzene and PM_{10} will arise as a result of construction activities.

The removal of existing turbines and construction of turbines and associated foundations and hardstanding areas, access tracks, temporary construction compounds, onsite 110kV substation, underground electrical cabling, peat and spoil management, site drainage, biodiversity enhancement, turbine delivery route (TDR) accommodation works and all ancillary works and apparatus, will require the operation of construction vehicles and plant. This potential effect will not be significant and will be restricted to the duration of the construction phase and localised to works areas. Therefore, this constitutes a short-term, slight, negative effect in terms of air quality. Mitigation measures in relation to exhaust emissions are presented below.

Proposed Grid Connection Route

The construction of underground cabling connecting the proposed 110kV underground cabling connecting the proposed onsite 110kV substation to the existing Srananagh 220kV substation, will require the use of construction machinery, thereby giving rise to exhaust emissions such as NO_2, Benzene and PM_{10}, as already outlined for the Proposed Wind Farm activities. This is a short-term, slight, negative effect, which will be reduced through use of the best practice mitigation measures as presented below.

Transportation to and from the Site

The transport of turbine components, supporting infrastructure materials, construction and staff vehicles, small volume of aggregate material, and waste removal vehicles to/from the Proposed Wind Farm and Proposed Grid Connection Route (which will occur on specified routes only, refer to Section 4.5 of Chapter 4 of this EIAR), the departure of empty vehicles and/or minor waste volumes (please see accompanying CEMP Appendix 4-5) from the site and daily staff movements, will give rise to exhaust emissions associated with the transport vehicles. This constitutes a short-term, slight, negative effect in terms of air quality, which is not significant. Mitigation measures in relation to exhaust emissions are presented below.

Mitigation and Monitoring Measures

- Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.
- All plant and materials vehicles shall be stored in dedicated areas (onsite). Machinery will be switched off when not in use.
- Turbines and construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. Please see Chapter 15: Material Assets for details.

- Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
- All waste generated during the construction of the Proposed Wind Farm will be source segregated at the Site. The waste will be separated, and put in labelled, covered skips to promote reuse, recycling and diversion from landfill. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be recycled, recovered or disposed of appropriately. The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.
- The majority of aggregate materials for the construction of the Proposed Project will be obtained from the borrow pits on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5). The CEMP includes measures to reduce exhaust emissions.

Residual Effect

With the implementation of the above measures for the construction phase, residual effects on air quality arising from exhaust emissions associated with construction activities and machinery will have a short-term, imperceptible, negative effect.

Significance of Effects

The effects on air quality from exhaust emissions arising from the construction of Proposed Project infrastructure during the construction phase of the Proposed Project are considered to be Not Significant.

10.3.2.2 Dust Emissions

Pre-Mitigation Impact

Proposed Wind Farm

The removal of the Existing Wind Farm turbines, construction of turbines and associated foundations and hardstanding areas, access tracks, temporary construction compounds, onsite 110kV substation, underground electrical cabling, peat and spoil management, site drainage, biodiversity enhancement, turbine delivery route (TDR) accommodation works and all ancillary works and apparatus will give rise to dust emissions. In order to accommodate the delivery of turbine components, accommodation areas will be required at various locations on the national and regional road network between the port of arrival in Killybegs and the Proposed Wind Farm. Works associated with the accommodation areas will give rise to localised dust emissions.

The majority of the construction materials for the Proposed Project will be sourced onsite from the 3. no. proposed borrow pit (Section 4.3.2.4 of Chapter 4), where an estimated 299,500 m3 of materials will be extracted. The removal of the overburden followed by its management and transportation off site during the construction phase will give rise to dust emissions. In addition to the gravel, cobbles and boulder material to be extracted from the proposed borrow pits, it is anticipated that the required engineering fill and higher quality, surfacing granular fill and sand will be sourced from local, authorised quarries.

The removal of the topsoil followed by its transportation and deposition at the peat and spoil management areas during the construction phase will give rise to dust emissions.

The IAQM 2024 Guidance, as discussed in Section 10.1.6.3 above, is used to assess the potential risk to high sensitivity receptors from dust deposition. Dust deposition impacts can occur for a distance of 250m from works areas, but the majority of deposition occurs within the first 50m (IAQM, 2024). The high sensitivity receptors were identified using a constraints mapping process, and detailed and updated planning searches which informed the project sensitive receptor dataset.

The high sensitivity receptors (as defined in the IAQM 2024 Guidance[18]) located within the appropriate distance from potential dust emission sources, provided by the IAQM 2024 Guidance, are detailed below and presented in Figure 10-3 below for the Proposed Wind Farm.

- There are 4 no. high sensitivity receptors located within 20m of the Proposed Wind Farm infrastructure footprint;
- There are 15 no. high sensitivity receptor within 50m of the Proposed Wind Farm infrastructure footprint;
- There are 21 no. high sensitivity receptors within 100m of the Proposed Wind Farm infrastructure footprint;
- There are 91 no. high sensitivity receptors within 250m of the Proposed Wind Farm infrastructure footprint.

[18] https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf *(pg 19) High sensitivity receptors are defined as locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.*

540000 545000 550000 555000 560000 565000 570000 575000

840000 835000 830000 825000 820000 815000

N

De Valera Park
R297
N59
Dromore
Raghly
Carney
Glencar Lough
Drumcliff South
N16
Ballyweelin
Coney Island
Ballisodare
Larass
286
R292
Dromore
N59
Kilmacowen
R287
Kilboglashy
Castle Dargan
Kingsfort
(Tirerrill By
Ballygawley
Collooney
R284
Toberscanavan
Loughs
Easky Lough
Ballynaboll
Ballinacarrow
Carrickbanagher
Riverstown
N4
Rathnakelliga
R296
Achonry

0 5.5 11 km

Map Legend

- EIAR Site Boundary
- Propose Project Infrastructure Footprint
- Sensitive Dust Receptors
- 20m IAQM Dust Deposition Band
- 50m IAQM Dust Deposition Band
- 100m IAQM Dust Deposition Band
- 250m IAQM Dust Deposition Band

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

SITE LOCATION - NOT TO SCALE

Drawing Title
IAQM Dust Deposition Bands and Relevant Sensitive Receptors for Assessment

Project Title
Crumhach Wind Farm, Co. Sligo

Project No.	Drawing No.	Scale
230841	10-3	1:110,000
Drawn By	Checked By	Date
MVN	BT	09/06/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

Table 10-16 below identifies the sensitivity of the area surrounding the development footprint of the Proposed Wind Farm to dust soiling effects, as described in Section 10.1.6.3 above. As there are 4 no. sensitive properties within 20m of the Proposed Wind Farm footprint and 15 no. sensitive properties within 50m of the Proposed Wind Farm footprint, the overall sensitivity of the area to dust soiling impacts is considered to be '**Medium**'. For the construction phase of the Proposed Wind Farm, the potential impact from dust emissions is considered to be a short term, moderate, negative effect, which is not significant.

Table 10-16 Sensitivity of the Area to Dust Soiling Effects on People and Property. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 10-17 below identifies the high sensitivity receptors in the area surrounding the development footprint of the Proposed Wind Farm to the health effects of PM_{10}, as described in Section 10.1.6.3.1 above. The overall sensitivity of the area to human health effects of PM_{10} is considered to be '**Low**'. As indicated in Section 10.1.6.1 above, the Proposed Project is situated in Zone D. According to the 2021 EPA baseline air quality data[19]; the average PM_{10} for Zone D is 14µg/m^3. Therefore, the only annual PM_{10} concentration categorised in the IAQM 2024 Guidance relevant to the Proposed Project is the minimum concentration of <24µg/m^3 (<14 µg/m^3 in Scotland).

Table 10-17 Sensitivity of the Area to Human Health Impacts from the Proposed Wind Farm construction works. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	<24 µg/m^3 (<14 µg/m^3 in Scotland)	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	<24 µg/m^3 (<14 µg/m^3 in Scotland)	>10	Low	Low	Low	Low
		1-10				

[19] https://www.epa.ie/resources/charts-data/air/air-quality--pm10.php

Low	-	≥1	Low	Low	Low	Low

Table 10-18 below identifies the sensitivity of the receptors to ecological effects in the area surrounding the development footprint of the Proposed Wind Farm. As noted above in Section 10.1.6.3, there are 8 no. sensitive ecological receptors (habitats) within 20m of the Proposed Wind Farm footprint, 5 no. of which include Annex 1 Habitat Blanket Bog, Annex 1 Habitat Cutover Bog, Annex 1 Wet Heath, Ox Mountain Bogs SAC and the Unshin River SAC. The Dunneill River, Easky River and Buncrowey River (medium sensitivity ecological receptors) are located within 20m and 50m, respectively, of the Proposed Wind farm footprint. The overall sensitivity of the areas surrounding the development footprint of the Proposed Wind Farm is '**Medium**'. Please note, a detailed ecological impact assessment assessing impacts on these ecological receptors during the construction phase (including effects from dust) is contained in Chapter 6 of this EIAR and the NIS.

Table 10-18 Sensitivity of the Proposed Wind Farm to Ecological Impacts. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Distance from source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

As identified in Section 10.1.6.3 above, the Proposed Wind Farm is classified as 'Large' for Demolition, Earthworks, Construction and Trackout activities. Therefore, when combined with the sensitivity of the area, using Tables 10-6 to 10-8 above as guidance, the pre-mitigation risk of impacts from the Proposed Wind Farm is summarised in Table 10-19 below.

Table 10-19 Summary Dust Risk Table for Proposed Wind Farm Activities

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low Risk	Low Risk	Low Risk
Human Health	N/A	Low Risk	Low Risk	Low Risk
Ecological	N/A	Medium Risk	Medium Risk	Medium Risk

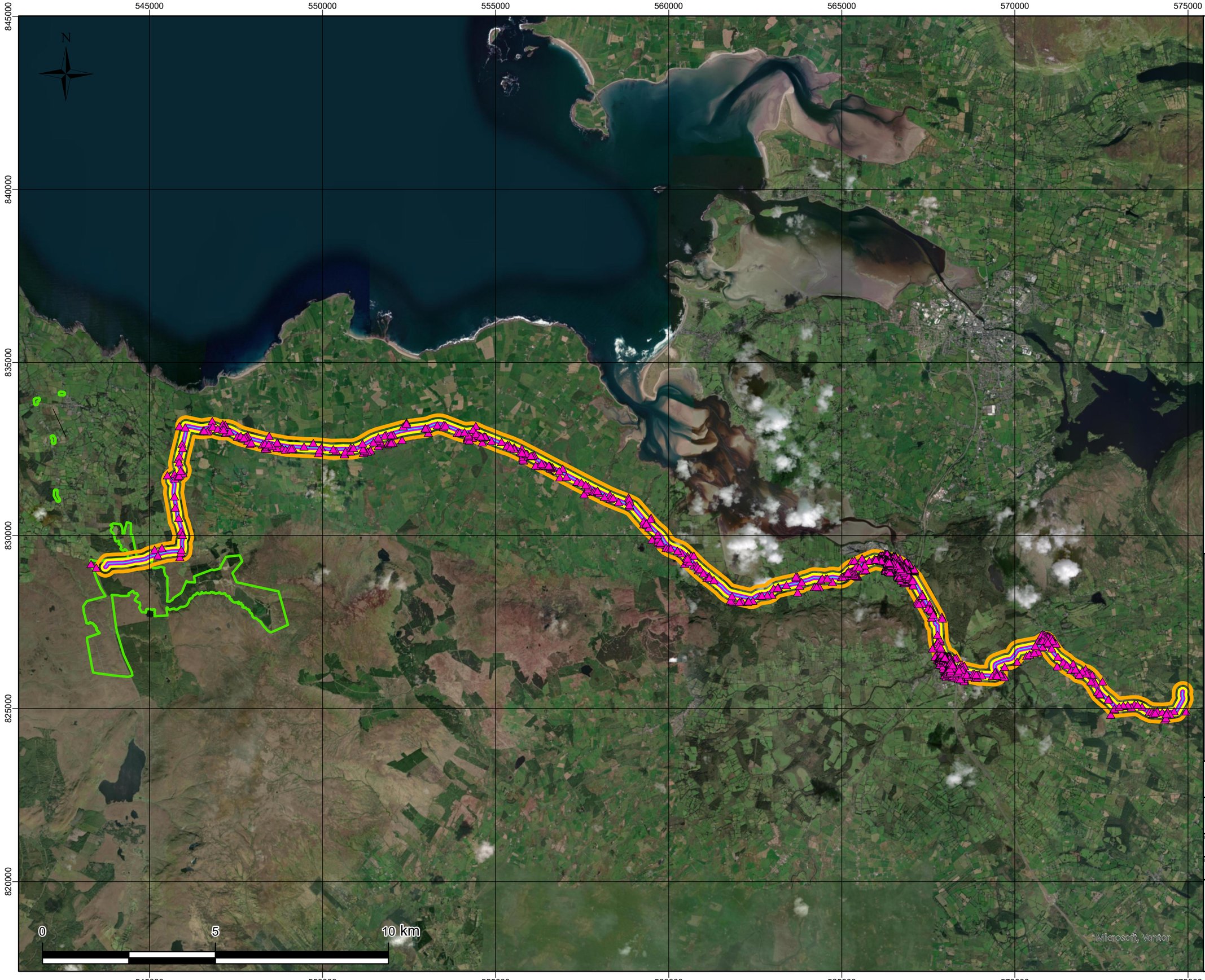
The overall risk of dust emissions impacts with no mitigation applied for the major dust generating activities during the construction phase of the Proposed Wind Farm is '**Medium**'. Therefore, the potential effects of dust from the construction phase of the Proposed Wind Farm are considered to be equivalent to short-term, moderate negative effect, which is not significant.

Proposed Grid Connection Route

The construction of the Proposed Grid Connection Route will give rise to dust emissions. Aggregate materials for the construction of the Proposed Grid Connection Route will be sourced from local quarries, where possible. Please refer to Section 4.5.2 in Chapter 4 for further information.

The number of high sensitivity receptors within 250m from the Proposed Grid Connection works areas and their likely risk of dust impacts during the construction works, as highlighted in the IAQM 2024 Guidance discussed above are detailed below and presented in Figure 10-4 below.

- There are 172 no. high sensitivity receptors located within 20m from the Proposed Grid Connection Route footprint;
- There are 402 no. high sensitivity receptors located within 50m of the Proposed Grid Connection Route footprint; 1 no. of which is also located within 50m of the Proposed Wind Farm footprint;
- There are 644 no. high sensitivity receptors located within 100m of the Proposed Grid Connection Route footprint (2 no. of which are also located within 100m of the Proposed Wind Farm footprint and;
- There are 1,382 no. high sensitivity receptors located within 250m of the Proposed Grid Connection Route footprint.



Map Legend

- EIAR Site Boundary
- Proposed Grid Connection Route
- Sensitive Receptors
- 20m Dust Deposition Band
- 50m IAQM Dust Deposition Band
- 100m IAQM Dust Deposition Band
- 250m IAQM Dust Deposition Band

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator

SITE LOCATION - NOT TO SCALE

Drawing Title
Proposed Grid Connection Route IAQM Dust Deposition Bands

Project Title
Crumhach Wind Farm, Co. Sligo

Project No.	Drawing No.	Scale
230841	10-4	1:100,000
Drawn By	**Checked By**	**Date**
MVN	BT	21/05/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

Table 10-20 below identifies the sensitivity of the area surrounding the development footprint of the Proposed Grid Connection Route to dust soiling effects, as described in Section 10.1.6.3 above. The overall sensitivity of the area to dust soiling effects is '**High**'. For the construction phase of the Proposed Grid Connection Route, the impact from dust emissions is considered to be a short term, significant, negative effect, which is significant. In practice, the works along the Proposed Grid Connection Route will be transient in nature with approximately 100m-150m of active works areas along the Proposed Grid Connection Route per day, and the the construction duration may be significantly reduced using 2 construction crews operating at different locations on the Proposed Grid Connection Route.

Table 10-20 Sensitivity of the Area to Dust Soiling Effects from the Proposed Grid Connection Route construction works on People and Property. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 10-21 below identifies the high sensitivity receptors in the area surrounding the development footprint of the Proposed Grid Connection Route to the health effects of PM_{10}, as described in Section 10.1.6.3 above. The overall sensitivity of the area to human health effects of PM_{10} is '**Medium**'. As indicated in Section 10.1.6.1 above, the Proposed Project is situated in Zone D. According to the 2021 EPA baseline air quality data[20]; the average PM_{10} for Zone D is 14µg/m^3. Therefore, the only annual PM_{10} concentration categorised in the IAQM 2024 Guidance relevant to the Proposed Project is the minimum concentration of <24µg/m^3 (<14 µg/m^3 in Scotland).

Table 10-21 Sensitivity of the Area to Human Health Impacts from Proposed Grid Connection Route construction works. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024).

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	<24 µg/m^3 (<14 µg/m^3 in Scotland)	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	<24 µg/m^3 (<14 µg/m^3 in Scotland)	>10	Low	Low	Low	Low
		1-10				
Low	-	≥1	Low	Low	Low	Low

[20] https://www.epa.ie/resources/charts-data/air/air-quality--pm10.php

Table 10-22 below identifies the sensitivity of the receptors to ecological effects in the area surrounding the development footprint of the Proposed Grid Connection Route. As identified in Section 10.1.6.3.1 above, there are 3 no. medium sensitivity ecological receptors, the Owenmore River, Arnaglass River, and the Unshin River SAC, within 20m of the Proposed Grid Connection Route. The overall sensitivity of the ecological receptors surrounding the Proposed Grid Connection Route is **'Medium'**. For the construction phase of the Proposed Grid Connection Route, the impact from dust emissions is considered to be a short term, moderate, negative effect, which is not significant. Please note, a detailed ecological impact assessment assessing impacts on these ecological receptors during the construction phase (including effects from dust) is contained in Chapter 6 of this EIAR and the NIS.

Table 10-22 Sensitivity of the Proposed Grid Connection Route to Ecological Impacts. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Distance from source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

As identified in Section 10.1.6.3 above, the Proposed Grid Connection Route is classified as 'Medium' for Earthworks, Construction, and Trackout activities. Therefore, when combined with the sensitivity of the area, using Tables 10-9 to 10-11 above as guidance, the pre-mitigation risk of impacts from the Proposed Grid Connection Route is summarised in Table 10-23.

Table 10-23 Summary Dust Risk Table for Proposed Grid Connection Route Activities

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium Risk	Medium Risk	Medium Risk
Human Health	N/A	Low Risk	Low Risk	Negligible
Ecological	N/A	Medium Risk	Medium Risk	Negligible

The overall risk of dust emissions impacts with no mitigation applied for the major dust generating activities during the construction phase of the Proposed Grid Connection Route is **'Medium'**. Therefore, the potential effects of dust from the construction phase of the Proposed Grid Connection Route, prior to mitigation being put in place, are considered to be equivalent to a short-term, moderate, negative effect, which is not significant.

Transportation to and from the Site

The transport of turbine components, supporting infrastructure materials, construction and staff vehicles, small volume of aggregate material and waste removal vehicles to/from the Site, the departure of empty vehicles and/or minor waste volumes (please see accompanying CEMP Appendix 4-5) from the Site and daily staff movements will also give rise to some localised dust emissions during periods of dry weather.

The IAQM 2024 Guidance states that the routes of construction traffic should also be included in an assessment of dust arising from trackout, and that related construction dust impact increases with respect to the number of movements of HGVs per day, length of unpaved road, distance to receptors and the sensitivity of local receptors.

For the purposes of this assessment of the dust emissions arising from trackout related to the construction of the Proposed Project, the L6309 local road and the L2702 local road, along which the proposed site entrances are located, was scoped in for assessment. Beyond either end of these local roads, construction traffic will disperse in different directions along different routes to a degree that there will be no potential for significant effects from trackout related dust emissions. In relation to the turbine delivery route and construction traffic related to the proposed new site access along the L6309 to the north of the Proposed Wind Farm and the L2702 to the west of the Proposed Wind Farm, it is considered that the numbers of vehicle movements per day will be low and therefore there will be no potential for significant effects from trackout related dust emissions. The L6309 and L2702, scoped for assessment, comprise approximately a 6km stretch of local roads. The L6309 runs west–east to the north of the Proposed Wind Farm, while the L2702 runs north–south to the west of the Proposed Wind Farm.

The IAQM 2024 Guidance as discussed in Section 10.1.6.3 above is used to assess the potential risk to high sensitivity receptors from dust deposition. Dust deposition impacts can occur for a distance of 250m from source (the 6km stretch of the L6309 and the L2702), but the majority of deposition occurs within the first 50m (IAQM, 2024). The high sensitivity receptors were identified using a constraints mapping process, and detailed and updated planning searches which informed the project sensitive receptor dataset. The sensitive receptors located within the appropriate distance from potential dust emission sources, provided by the IAQM 2024 Guidance, are detailed below and presented in Figure 10-5 below.

- There are 2 no. high sensitivity receptors located within 20m of the identified 6km stretch of the L6309 and the L2702;
- There are 2 no. high sensitivity receptors within 50m of the identified 6km stretch of the L6309 and the L2702;
- There are 5 no. high sensitivity receptors within 100m of the identified 6km stretch of the L6309 and the L2702;
- There are 10 no. high sensitivity receptors within 250m of identified 6km stretch of the L6309 and the L2702.

542000

544000

546000

830000

828000

826000

N

0

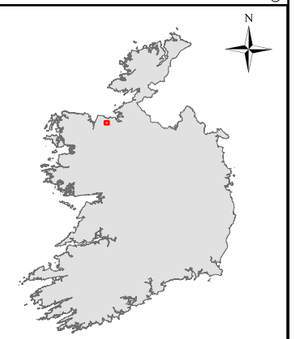
0.85

1.7 km

Map Legend

- EIAR Site Boundary
- High Sensitivity Receptors
- L6309 and L2702 Local Roads
- 20m IAQM Dust Deposition Band
- 50m IAQM Dust Deposition Band
- 100m IAQM Dust Deposition Band
- 250m IAQM Dust Deposition Band
- Propose Project Infrastructure Footprint

Spatial Reference
Name: IRENET95 Irish Transverse Mercator
Datum: IRENET95
Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title
Public Road Trackout IAQM Dust Deposition Bands

Project Title
Crumhach Wind Farm, Co. Sligo

Project No.	Drawing No.	Scale
230841	10-5	1:17,500
Drawn By	Checked By	Date
MVN	BT	09/06/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

Table 10-24 below identifies the sensitivity of the area surrounding the L6309 and the L2702 to dust soiling effects from trackout, as described in Section 10.1.6.3 above.

As per the criteria in Table 10-24 below, there are 2 no. high sensitivity receptors within 20m of the L6309 and the L2702, and 2 no. high sensitivity receptors within 50m of the L6309 and the L2702. The overall sensitivity of the area to dust soiling impacts is considered to be '**Medium'**.

Table 10-24 Sensitivity of the Area to Dust Soiling Effects on People and Property. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 10-25 below identifies the high sensitivity receptors in the area surrounding the L6309 and the L2702 to the health effects of PM_{10}, as described in Section 10.1.6.3 above. The overall sensitivity of the area to human health effects of PM_{10} is considered to be '**Low'**. As indicated in Section 10.1.6.1 above, the Proposed Project is situated in Zone D. According to the 2021 EPA baseline air quality data[21]; the average PM_{10} for Zone D is 14µg/m^3. Therefore, the only annual PM_{10} concentration categorised in the IAQM 2024 Guidance relevant to the Proposed Project is the minimum concentration of <24µg/m^3 (<14 µg/m^3 in Scotland).

Table 10-25 Sensitivity of the Area to Human Health Impacts from the transportation of construction plant and vehicles on the identified 2.6km stretch of the L6309 local road. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	<24 µg/m^3 (<14 µg/m^3 in Scotland)	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	<24 µg/m^3 (<14 µg/m^3 in Scotland)	>10	Low	Low	Low	Low
		1-10				
Low	-	≥1	Low	Low	Low	Low

[21] https://www.epa.ie/resources/charts–data/air/air-quality–pm10.php

As identified in Section 10.1.6.3 above, the Proposed Wind Farm is classified as 'Large' for Trackout activities, and the Proposed Grid Connection Route is classified as 'Medium' for Trackout activities. Therefore, when combined with the sensitivity of the area, using Table 10-11 above as guidance, the pre-mitigation risk of impacts from the Proposed Wind Farm and Proposed Grid Connection Route on the identified 6km stretch of the L6309 and L2703 local roads are summarised in Table 10-26 below.

Table 10-26 Summary Dust Risk Table for the identified 2.6km stretch of the L6309.

Potential Impact	Dust Emission Magnitude	
	Trackout (Proposed Wind Farm)	Trackout (Proposed Grid Connection Route)
Dust Soiling	Medium Risk	Medium Risk
Human Health	Low Risk	Low Risk
Ecological	N/A	N/A

The overall risk of dust emissions impacts on the identified 6km stretch of the L6309 and the L2702, with no mitigation applied for the major dust generating activities, during the construction phase of the Proposed Wind Farm and Proposed Grid Connection Route is '**Medium'**. Therefore, the potential effects of dust from the construction phase of the Proposed Project are considered to be equivalent to short-term, moderate, negative effect, which is not significant.

Mitigation and Monitoring Measures

- Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, Proposed Grid Connection Route, road widening sections, substation, and construction compounds and around the borrow pit area to ensure dust does not cause a nuisance.
    - Water bowser movements will be carefully monitored to ensure water is evenly dispersed and sprayed to address potentially dusty areas.
- All plant and materials vehicles shall be stored in dedicated areas within the Site.
- Areas of excavation will be kept to a minimum and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in peat and spoil management areas and restoration of borrow pits.
- The Proposed Turbines components, construction materials and the associated infrastructure for the Proposed Grid Connection Route will be transported to the site on specified haul routes only, as agreed with the local authority.
    - The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager.
- The transport of construction materials may have the potential to generate dust in dry weather conditions. Roads will be watered down to suppress dust particles in the air as deemed necessary by the Site Supervisor/Manager.
- The transportation of construction materials from locally sourced quarries for the Proposed Grid Connection Route infrastructure and for the Proposed Wind Farm will be covered by tarpaulin where necessary.
- The transport of dry excavated material from the on-site borrow pits, which may have potential to generate dust will be minimised. If necessary, such as in periods of dry

weather, excavated material will be dampened prior to transport from the borrow pits.

- Weather will be monitored in conjunction with visual checks on dust generation in order to decrease response times. Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.
    - The MRF facility will be local to the Proposed Project to reduce the amount of emissions associated with vehicle movement.
- A CEMP will be in place throughout the construction phase (see Appendix 4-5). The CEMP includes dust suppression measures.

Residual Effect

With the implementation of the above, the Proposed Project is considered to have a short-term, slight, negative effect on air quality brought about by dust emissions generated during the construction activities.

Significance of Effects

The effects on air quality from dust emissions arising from the construction of Proposed Project infrastructure during the construction phase of the Proposed Project are considered to be Not Significant.

10.3.3 Operational Phase

10.3.3.1 Exhaust Emissions

Pre-Mitigation Impact

Proposed Wind Farm

The operational phase of the Proposed Wind Farm will generate additional traffic to the area in the form of light goods vehicles (LGVs) visiting the Site 1-2 times per day for inspections but on occasion, daily visits by LGVs and HGVs may be required over short periods during maintenance/component replacement activities. The addition of a LGV to the area 1-2 times per day during the operational phase will give rise to a long-term, imperceptible, negative effect on air quality due to exhaust emissions, which is not significant.

The addition of several HGVs on occasion over the 35-year lifetime of the Proposed Project will give rise to a long-term, imperceptible, negative effect due to the localised and intermittent nature of the maintenance.

In addition to the above, the Proposed Wind Farm access tracks will continue to be used as a working farm and therefore farm machinery will continue to utilise the access tracks as required.

The permanent onsite 110kV substation will be operated and maintained by the Electricity Supply Board (ESB). It is anticipated that substation operators will visit the Site 1-2 times per day in LGVs but on occasion, HGVs may be required to visit the Site for maintenance/substation component replacement. On occasion, the removal of hydrocarbons (transformer oil) and waste from substation welfare facilities will be removed from the Site by a licenced waste disposal company. The addition of a LGV to the area 1-2 times per day during the operational phase will give rise to a long-term, imperceptible, negative effect on air quality due to exhaust emissions, which is not significant. The

addition of several HGVs on occasion over the 35-year lifetime of the Proposed Project will give rise to a long-term, imperceptible, negative effect on air quality.

Proposed Grid Connection Route

Exhaust emissions resulting from the Proposed Grid Connection Route will be negligible given that less vehicle movements than identified for the Proposed Wind Farm above are associated with the Proposed Grid Connection Route. During the operational phase, occasional maintenance and monitoring activities will be required for the Proposed Grid Connection Route, therefore, this will give rise to a long-term, imperceptible, negative effect on air quality due to exhaust emissions, which is not significant.

Mitigation and Monitoring Measures

- Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise.
- When stationary, delivery and onsite vehicles will be required to turn off engines.
- Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.
    - The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.

Residual Effect

Based on the above, the impact on air quality from exhaust emissions during the operational phase is a long-term, imperceptible, negative effect.

Significance of Effects

The effects on air quality from exhaust emissions arising during the operational phase of the Proposed Project are considered to be Not Significant.

10.3.3.2 Dust Emissions

Pre-Mitigation Impact

Proposed Wind Farm

As discussed above in Section 10.3.3.1, the operational phase of the Proposed Wind Farm will generate additional traffic to the area in the form of LGVs 1-2 visits per day and on occasion, daily LGVs and HGVs for short periods if maintenance or component replacement is required. This additional traffic may give rise to dust emissions. This will be a long-term imperceptible negative impact on air quality, which is not significant, due to dust emissions.

The permanent onsite 110kV substation will be operated and maintained by ESB. It is anticipated that substation operators will visit the Site 1-2 times per day in LGVs but on occasion, HGVs may be required to visit the Site for maintenance/substation component replacement. On occasion, the removal of hydrocarbons (transformer oil) and waste from substation welfare facilities will be removed from the Site by a licenced waste disposal company. This additional traffic may give rise to dust emissions. This will be a long-term imperceptible negative impact on air quality due to dust emissions.

Proposed Grid Connection Route

Dust emissions resulting from the Proposed Grid Connection Route will be negligible given that less vehicle movements than identified for the Proposed Wind Farm above are associated with the Proposed Grid Connection Route. Therefore, during the operational phase, maintenance and monitoring activities will give rise to a long-term, imperceptible, negative effect on air quality due to exhaust emissions, which is not significant.

Mitigation and Monitoring Measures

- Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any dust emissions that arise.

Residual Effect

Based on the above, the residual effect on air quality from dust emissions during the operational phase is a long-term imperceptible negative effect.

Significance of Effects

The effects on air quality from dust emissions arising during the operational phase of the Proposed Project are considered to be Not Significant.

10.3.3.3 Air Quality

Pre-Mitigation Impact

Although a long-term imperceptible negative effect on air quality is expected during the operational phase due to exhaust and dust emissions from maintenance vehicles, there will be a net reduction in carbon dioxide (CO_2) emissions from operation of the Proposed Project. By providing an alternative to electricity derived from coal, oil or gas-fired power stations, the Proposed Project will result in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2). The production of renewable energy from the Proposed Project will have a long-term moderate positive effect on air quality due to the offsetting of approximately 55,760 tonnes of Carbon Dioxide (CO_2) per annum. Please see Section 11.4.3.2 of Chapter 11: Climate for further details on carbon displacement calculations.

Mitigation and Monitoring Measures

No mitigation required.

Residual Effect

The overall effect will be a long-term moderate positive effect on air quality due to the offsetting of approximately 55,760 tCO_2eq per annum (see Chapter 11 for details), due to the provision of renewable energy in the range of approximately 74,460 Irish households with electricity per year.

Significance of Effects

The effects on overall improved air quality during the operational phase of the Proposed Project are considered to be Not Significant.

10.3.3.4 Human Health

Pre-Mitigation Impact

Whilst the operational phase of the Proposed Project will give rise to minor increases in dust and vehicle emissions, the implementation of the mitigation measures discussed above, and good management practices can prevent or minimise potential effects off-site. Good management practice consists of adopting appropriate working methods, choosing the right equipment and ensuring that the workforce understands the company's responsibilities and is familiar with good working practice and dust suppression techniques. The potential for health effects are considered negligible as the potential for both exhaust and dust emissions will be limited and controlled through mitigation measures outlined in Sections 10.3.2.1 and 10.3.2.2.

Exposure to chemicals such as SO_2 and NO_x, Pb, benzene and O_3 are thought to be harmful to human health. The production of clean renewable energy from the Proposed Wind Farm will offset the emission of these harmful chemicals by fossil fuel powered sources of electricity and, therefore, will have a long term, moderate, positive impact on human health. Further information on the impact of the Proposed Project on human health is contained in Chapter 5: Population and Human Health.

Mitigation and Monitoring

No mitigation required.

Residual Effect

No residual effects.

Significance of Effects

The effects on human health arising from improved air quality during the operational phase of the Proposed Project are considered to be Not Significant.

10.3.4 Decommissioning Phase

The Proposed Wind Farm is seeking permission for an operational life of 35 years. Wind turbines are expected to have a lifespan of approximately 35 years. Following the end of their life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Wind Farm may be decommissioned fully. The proposed onsite 110kV substation and Proposed Grid Connection Route will remain in place as it will be under the ownership and control of the ESBN and EirGrid and will form a permanent part of the national electricity grid. The onsite 110kV substation will result in no additional truck movements or requirement for demolition or removal works for this piece of infrastructure. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance for an underground element that is not visible.

The works required during the decommissioning phase are described in Section 4.10 of Chapter 4.

A Decommissioning Plan is included as Appendix 4-6 of this EIAR for the decommissioning of the Proposed Project, the detail of which will be agreed with the local authority prior to any decommissioning. Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, albeit of lesser effect. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the

decommissioning phase thereby minimising any potential effects. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed within this EIAR.

10.3.5 Cumulative Effects

The potential for impact between the Proposed Project, and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Project will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or Proposed Project s and plans in the vicinity of the Site, such as other wind energy developments, extractive industries, battery energy storage systems, forestry etc. Please see Section 2.9 of Chapter 2: Background to the Proposed Project for the cumulative assessment methodology used.

During the construction phase of the Proposed Project and the construction of other permitted or proposed developments and plans in the area (please see Section 2.9 in Chapter 2 and Appendix 2-3 of this EIAR), there will be exhaust emissions from construction plant and machinery and potential dust emissions associated with the construction activities. However, once the mitigation proposals, as outlined in the above assessment are implemented during the construction phase of the Proposed Project, there will be no cumulative negative effect on air quality.

Exhaust and dust emissions during the operational phase of the Proposed Project will be minimal, relating to the use of maintenance machinery and vehicles onsite, and therefore there will be no measurable negative cumulative effect with other developments on air quality.

The nature of the Proposed Project is such that, once operational, it will have a long-term, moderate, positive impact on the air quality. There will be no measurable negative cumulative effect with other developments on air quality.

10.3.5.1 Construction Phase

During the construction phase of the Proposed Project, and other permitted or Proposed Projects and plans in the area, there will be minor exhaust emissions from construction plant and machinery and potential dust emissions associated with the construction activities. However, once the mitigation proposals, as outlined in Sections 10.3.2.1 and 10.3.2.2 are implemented during the construction phase of the Proposed Project, there will be no cumulative negative effect on air quality.

As established in Section 10.3.2, there are short-term, slight to imperceptible, negative effects on air quality during the construction phase from:

- Exhaust emissions arising from the construction of Proposed Project infrastructure;
- Exhaust emissions arising from transit of vehicles to, from and within the Site;
- Dust Emissions arising from the construction of Proposed Project infrastructure; and,
- Dust emissions arising from the transit of vehicles to, from and within the Site.

Therefore, it is considered here will be no measurable cumulative effects on air quality, should other proposed or consented plans and projects within the surrounding landscape be constructed in parallel with the Proposed Project.

10.3.5.2 Operational Phase

Exhaust emissions of carbon dioxide (CO_2), oxides of nitrogen (NO_x), sulphur dioxide (SO_2) or dust emissions during the operational phase of the Proposed Project will be minimal, relating to the use of operation and maintenance vehicles onsite, and therefore there will be no measurable negative cumulative effect with other developments on air quality.

As established above in Section 10.3.3, there will be a long-term imperceptible negative effect on air quality due to:

- Exhaust and dust emissions from maintenance LGV vehicles visiting the approximately once daily for site inspections; and,
- Increased exhaust and dust emissions on occasion due to more frequent LGV and HGV visits during component or substation infrastructure replacement.

It is similarly established in Section 10.3.3 that there will be an overall long-term moderate positive effect on air quality given:

- There will be no net carbon dioxide (CO_2) emissions from operation of the Proposed Project. By providing an alternative to electricity derived from coal, oil or gas-fired power stations, the Proposed Project will result in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2).
- The production of renewable energy from the Proposed Project will have a long-term moderate positive effect on air quality due to the offsetting of approximately 55,760 tonnes of Carbon Dioxide (CO_2) per annum, or 1,951,600 tonnes of carbon dioxide over the proposed 35-year lifecycle of the Proposed Project.

It is therefore considered there will be no measurable negative cumulative effects on air quality should other proposed or consented plans and within the surrounding landscape be operational in parallel with the Proposed Project. However, once the Proposed Project is operational, there will be a long-term, moderate, positive impact on the air quality.

10.3.5.3 Decommissioning Phase

The works required during the decommissioning phase are described in Section 4.10 in Chapter 4: Description of the Proposed Project. Any cumulative impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential cumulative effects.

10.4 EIA Classification Summary

Please see the below table for a summary of all identified impacts for the Proposed Project relating to air quality.

Table 10-27 Impact Assessment Classification Summary

Topic	Pre-Mitigation Effect	Mitigation Section Reference	Residual Effect	Significance
Construction Phase				
Exhaust Emissions	Short-Term, Slight, Negative	Section 10.3.2.1	Short-Term, Imperceptible, Negative	Not Significant
Dust Emissions	Short-Term, Moderate, Negative	Section 10.3.2.2	Short-Term, Slight, Negative	Not Significant
Operational Phase				

Exhaust Emissions	Long-Term, Imperceptible, Negative	Section 10.3.3.1	Long-Term, Imperceptible, Negative	Not Significant
Dust Emissions	Long-Term, Imperceptible, Negative	Section 10.3.3.2	Long-Term, Imperceptible, Negative	Not Significant
Air Quality	Long-term, Moderate, Positive	N/A	Long-term, Moderate, Positive	Not Significant
Human Health	Long-term, Moderate, Positive	N/A	Long-term, Moderate, Positive	Not Significant
Decommissioning Phase				
Air Quality	Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration, and the mitigation measures outlined in Section 10.3.2 will be implemented during the decommissioning phase also	10.3.2	N/A	N/A