Environmental Impact Assessment Report

Lemanaghan Wind Farm, Co. Offaly

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 Good's 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. Alternative designs initially proposed for the Proposed Project and their potential for effects on air quality are considered in Chapter 3 Consideration of Alternatives.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Wind Farm', 'Proposed Grid Connection', 'Proposed Project site' and 'site'. Please see Section 1.1.1 of this EIAR for further details. 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 approximately 3 kilometres (km) northeast of Ferbane and approximately 2.5 km southwest of the village of Ballycumber in Co. Offaly. It is proposed to access the Proposed Wind Farm via 5 no. proposed access points utilising national, regional, and local roads; please see Section 4.7.1 of Chapter 4 Description of the Proposed Project for further information on site access.

It is intended to connect the Proposed Wind Farm to the national electricity grid via a looped 220kV overhead cable which will connect the proposed onsite 220kV substation to the Shannonbridge-Maynooth 220kV Overhead Line (OHL) in the townland of Cooldorragh, Co. Offaly, located approximately 0.4km north of the Proposed Project site at its closest point (the proposed onsite 220kV substation). The grid connection OHL cabling route will measure approximately 0.8km in total length.

The townlands in which the site is located, including the proposed onsite 220kV substation, are listed in Table 1-1 in Chapter 1 of this EIAR; all townlands are located in Co. Offaly.

Existing activities within the site include site management and environmental monitoring as required under IPC Licence P0-500-01, and temporary wind measurement (a single 100m meteorological mast). Active peat extraction ceased in June 2020. Under IPC Licence No. 500-01, Bord na Mona, (BnM) is required to commence decommissioning and rehabilitation of the Boora Bog Group, of which the site is part. Part of the decommissioning involves removing previously harvested and stockpiled peat from the bogs. The removal of stockpiled peat was completed by the end of 2024.

The landcover within the site is a mixture of bare cutaway peat, re-vegetated bare peat, degraded raised bog, scrub, low woodland and remnants of high bog. Current land use within the Proposed Wind Farm comprises peat cutting in areas of active turbary and natural recolonisation of degraded bog. Current land use along the Proposed Grid Connection comprises degraded raised bog and land principally used by agriculture. Land use in the wider landscape of the site comprises a mix of agriculture, peat cutting, and low-density residential.

The production of energy from wind turbines has no direct emissions as is expected from coal or oil-based power stations. Harnessing more energy by means of wind farms will reduce dependency on fossil fuel power stations, 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 of the Proposed Project include vehicular and dust emissions.

10.1.2 Relevant Guidance and Legislation

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 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)

10.1.3 Statement of Authority

This section of the EIAR has been prepared by Catherine Johnson with input from Edel Mulholland, and reviewed by Ellen Costello and Sean Creedon, all of MKO. Catherine is a Project Environmental Scientist and Climate Practitioner at MKO with over three years of consultancy experience in climate, renewable energy, and sustainability. Prior to joining MKO in 2022, Catherine worked as an Environmental Social Governance (ESG) analyst for Acasta in Edinburgh. Catherine has expertise in international climate law and policy, earth science, and sustainability/ESG processes. Catherine has a BSc in Earth and Ocean Science and an LLM in Global Environment and Climate Change Law.

Edel Mulholland 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.

10.2 Air Quality

10.2.1 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 ($\mu g/m^3$) 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.

10.2.2 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 CAFE 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 $\mu g/m^3$

10.2.2.1 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 ($PM_{2.5}$) from solid fuel combustion and nitrogen dioxide (NO_2) 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 10.2.2.1.1 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_x) 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_x) and 240 Irish deaths were attributable to Ozone (O_3).

The EEA published a briefing on '*Europe's Air Quality Status*' in April 2025[5]. 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, despite continuous 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:

- 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.

[3] *European Environment Agency. (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] *Europe's air quality status 2024 briefing.* <https://www.eea.europa.eu//publications/europes-air-quality-status-2024>

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*.'[6] 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 CO_2 per kilowatt-hour (g CO_2/kWh) of electricity generated, compared with about 980 g CO_2/kWh for coal and roughly 465 g 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 than wind. During combustion of high-emitting energy sources, other air pollutants, i.e., nitrogen oxides (NO_x) 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.

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 (NH_3), non-methane volatile organic compounds (NMVOC), sulphur dioxide (SO_2), nitrogen
- oxides (NO_x) and fine particulate matter ($PM_{2.5}$)
- Ammonia emissions are projected to be in compliance out to 2030

[6] *Office of Energy Efficiency and Renewable Energy (2023) How Wind Can Help Us Breathe Easier* < https://www.energy.gov/eere/wind/articles/how-wind-can-help-us-breathe-easier>
[7] *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>
[8] *Ibid.*

- An adjustment to NMVOC emissions is required in order to meet the required emission reduction commitment made in 2023.

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 minor emissions to be generated from 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.

10.2.2.1.1 *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 its 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.* <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.* < 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 Ireland's energy and emissions targets, as well as displacing emissions in other sectors, including household heating and vehicle transport. In the Clean Air Strategy, the 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 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.

10.2.3 Methodology

10.2.3.1 Air Quality Zones

The air quality zone for the Proposed Project 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 determined air quality zone to determine the representative levels of such emissions for the Proposed Project site.

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 with 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 described in the CAFE Directive. The Proposed Project site lies within Zone D, see Figure 10-2, which represents rural areas located away from large population centres.

Clara

Ferbane

Birr

Map Legend

EIAR Site Boundary

EPA Air Quality Zones

- Zone A
- Zone B
- Zone C
- Zone D

Drawing Title
Air Quality Zones surrounding the Proposed Project site

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
EM	EC
Project No. 200804	Drawing No. Figure 10- 2
Scale 1:300,000	Date 2025-10-17

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10.2.3.2 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. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D. These are detailed in the Existing Air Quality section.

10.2.3.3 Dust

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*'[11](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);
- Earthworks;
- Construction;
- Trackout[12]

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] *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*

[12] *The transport of dust and dirt from the 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 (HDV) 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 >6 m 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 4-3, 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 falls under the classification of 'Medium' for Earthworks and Construction due to the lower volumes of construction material required. The number of Heavy Goods Vehicles (HGV) movements per day, as outlined in Section 15.1 in Chapter 15 Material Assets of this EIAR, results in the classification of the Proposed Wind Farm as 'Large' and Proposed Grid Connection 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.

10.2.3.3.1 *Defining the Sensitivity of the Area*

For the purposes of this assessment, high-sensitivity receptors are residential properties and dust sensitive ecological habitats. 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[13].

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}

[13] *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*

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 10.2.3.1 above, the Proposed Project site is situated in Zone D. According to the 2024 EPA baseline air quality data[14]; the average PM_{10} for Zone D is 11.5µg/m^3. Therefore, the only annual PM_{10} concentration categorised in the IAQM 2024 Guidance relevant to the Proposed Project site 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
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low

[14] https://www.epa.ie/publications/monitoring--assessment/air/Summary-Tables-2024-for-Zones-A--D-for-upload-with-report-final.xlsx

Receptor Sensitivity	Annual Mean PM_{10} concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
		1-10	Medium	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/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 is one ecological receptor/habitat within the Proposed Project site, which as described by the IAQM 2024 Guidance, may be sensitive to dust. This ecologically sensitive habitat and its designation is listed below:
  - Cutover bog (PB4) - Medium Sensitivity.
- The Lemanaghan Stream River is located within the Proposed Project site.
- During the site walkover, the Lemanaghan Stream was observed on site which has been heavily altered during historical peat extraction activities and integrated into the existing bog drainage regime.

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

10.2.3.3.2 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 for Earthworks, Construction, 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

The risk of dust impacts for the Earthworks, Construction and Trackout activities from the Proposed Project site is set out in Section 10.3 below.

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 below.

10.2.4 Baseline Air Quality

The air quality in the vicinity of the Proposed Project site is typical of rural areas in the midlands 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.

10.2.4.1 Sulphur Dioxide (SO_2)

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

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

Parameter	Measurement
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 Proposed Project site are similar or lower than those recorded for the Zone D sites above.

10.2.4.2 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, Cork 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 Particulate Matter (PM_{10}) Data for Zone D Sites in 20212.

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

Parameter	Measurement
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

Notes: [1-] PM_{10} daily limit for the protection of human health: No more than 35 days >50 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 10.2.3.1) 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 Proposed Project site is similar or lower than those recorded for the Zone D sites above.

10.2.4.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide data for Emo Court, Birr, Castlebar, Carrick-on-Shannon, Kilkitt, Cork Mallow and Edenderry in 2024 is presented in Table 10-13 Nitrogen Dioxide Data for Zone D Sites in 20213.

Table 10-13 Nitrogen Dioxide Data for Zone D Sites in 2023

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 Proposed Project site is similar or lower than those recorded for the Zone D sites above.

10.2.4.4 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*'[15] 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 Carbon Monoxide Data for Birr - Zone D Site in 202314.

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

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

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 Proposed Project site are similar or lower than those recorded for the Zone D site above.

10.2.4.5 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 Ozone Data for Zone D Sites in 20215. 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 Proposed Project site would be similar or lower than those recorded for the Zone D sites below.

Table 10-15 Ozone Data for Zone D Sites in 2023

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

10.2.4.6 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 site.

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.

In the past, as a requirement of Condition 5 of the IPC Licence (Reg. P0500-01), monitoring for dust deposition was undertaken in the Boora Bog Group (in which the Proposed Project site is located). The monitoring results are reported in the Annual Environmental Report (AER) each year, which are publicly available on the EPA portal[16]. Monitoring was conducted at 3 no. locations in the Boora Bog Group: DM-01 Clongawney, DM-02 Pollagh and DM-03 Derryclure. While monitoring was not specifically conducted at the Proposed Project site, the three monitoring locations within the Boora Bog Group (within which the Proposed Project site is located) can be considered representative of the

[16] *AERs for the period 2008-2017 when peat extraction was underway at the Wind Farm Site can be found on the EPA licence portal at the following link. https://epawebapp.epa.ie/licsearchdownload/CombinedFileView.aspx?regno=P0500-01&classification=Enforcement and for the period 2018-2024 can be found at the following link: https://leap.epa.ie/licence-profile/P0500/compliance*

Proposed Project site at this time. Dust monitoring was carried out during historical peat extraction activities and, while it is likely that dust emissions were similar at the Proposed Project site due to the similar nature of activities at the time, these activities had ceased across the Boora Bog by 2020 and therefore the air quality data is not representative of the current air quality at the Proposed Project site. No dust monitoring was carried out in the Boora Bog Group from 2021 – 2024 due to the cessation of peat extraction activities in 2020, as it was deemed unnecessary to continue monitoring for dust.

The potential dust-related effects on local air quality and the relevant associated mitigation measures are presented in Sections 10.3 below.

10.3 Likely Significant Effects and Associated Mitigation Measures

10.3.1 'Do-Nothing' Effect

If the Proposed Project were not to proceed, the site would continue to be managed under the requirements of the IPC licence (P0500-01) and therefore the ongoing decommissioning activities, site management and environmental monitoring would continue.

In the absence of the Proposed Project, natural revegetation processes would continue across the site. Areas of bare peat would progressively revegetate and transition through successional stages, potentially developing into heath communities, scrub or bog woodland over time, depending on local hydrological conditions. Therefore, the existing baseline of the landscape will transition from a predominantly industrial cutover peatland landscape, with open exposed peat surfaces and drainage features, to a more natural mosaic landscape of cutaway peatland, wetland and regenerating bog habitats.

The Proposed Project site is located on lands that are subject to ongoing and future peatland rehabilitation and decommissioning works required under the existing IPC Licence. Therefore, under a 'Do-Nothing' scenario, the implementation of the Draft Rehabilitation Plans as required under IPC License would continue. These rehabilitation works are mandatory and will proceed irrespective of whether the Proposed Project is permitted, in order to ensure compliance with the IPC Licence.

If the Proposed Project was not to proceed, there would be no exhaust emissions from construction plant and vehicles, nor would there be dust emissions due to the movement of same.

If the Proposed Project were not to proceed, the opportunity to capture a significant part of County Offaly's and Ireland's valuable renewable energy resources would be lost, as would the opportunity to contribute to meeting Government and EU Targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment and to diversify the local economy would also be lost.

10.3.2 Construction Phase

10.3.2.1 Exhaust Emissions

Proposed Project

The construction of turbines and associated foundations and hard-standing areas, meteorological mast, borrow pits, access roads, temporary construction compounds, turbine delivery accommodation works, proposed enhancement areas, underground cabling, peat deposition areas, site drainage, vegetation removal and all ancillary works and apparatus (as outlined in Chapter 4 of this EIAR) will require the operation of construction vehicles and plant on and off-site, and the transport of workers to and from the site. Exhaust emissions associated with vehicles and plant such as NO_2, Benzene and PM_{10} will arise

as a result of construction activities. 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 is considered a short-term, slight, negative effect. Mitigation measures to reduce this impact are presented below.

Works such as road widening are sometimes required along proposed turbine transport routes to accommodate the large vehicles used to transport turbine components to wind farm sites. The proposed transport route for the Proposed Project has been the subject of a route assessment and accommodation works have been identified in Section 4.7.4 of Chapter 4 and in Section 15.1.9 of Chapter 15. The accommodation works necessary to facilitate abnormal load delivery to the Proposed Wind Farm will require the use of construction machinery, thereby giving rise to exhaust emissions. This is a short-term, slight, negative effect, which is not significant and will be reduced through use of the best practice mitigation measures as presented below.

It is proposed to construct a 220kV electricity substation on-site. This 220kV substation will be connected to the national grid via a line break of the existing 220kV Shannonbridge-Maynooth OHL in the townland of Cooldorragh, Co. Offaly. The construction of the Proposed Grid Connection OHL cabling route will require the use of construction machinery, thereby giving rise to exhaust emissions. This is a short-term, slight, negative effect, which is not significant and will be reduced through use of the best practice mitigation measures as presented below.

Transportation to and from the Proposed Project site

The transport of turbines and construction materials to the site, which will occur on specified routes only (see Section 4.7.3 in Chapter 4 of this EIAR), as well as waste material and construction workers to and from the site (see Section 15.1.4 of this EIAR), will give rise to exhaust emissions associated with the transport vehicles. This constitutes a short-term, slight, negative effect, which is not significant in terms of air quality. Mitigation measures in relation to exhaust emissions are presented below.

Mitigation Measures

- All construction vehicles and plant used during construction will be maintained in good operational order while onsite. If any vehicle requires repair, this work will be carried out, thereby minimising any emissions that arise.
- Turbines components will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority.
- All machinery will be switched off when not in use.
- 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.
- 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.
- The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the Site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. 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 sorted into individual waste streams for recycling, recovery or disposal. The Materials Recovery Facility (MRF) will be local to the Proposed Project site to reduce the amount of exhaust emissions associated with vehicle movements. Derryclure Civic Amenity Site is the closest MRF to the Proposed Project and is approximately 19.4km southeast of the proposed turbine (T14).

- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes measures to reduce exhaust emissions.

Residual Effect

Following implementation of the mitigation measures above, residual effects from exhaust emissions arising during the construction phase of the Proposed Project will have a short-term, imperceptible, negative effect on air quality.

Significance of Effects

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

10.3.2.2 Dust Emissions

Proposed Project

The construction of turbines and associated foundations and hard-standing areas, meteorological mast, access roads, borrow pits, temporary construction compounds, underground cabling, OHL cabling and associated infrastructure, onsite 220kV substation, site drainage, vegetation removal and all ancillary works and apparatus (as outlined in Chapter 4 of this EIAR) will give rise to dust emissions during the construction phase.

The majority of the construction materials for the Proposed Project will be sourced onsite from the 4 no. proposed borrow pit (Section 4.4.3.3 of Chapter 4), where an estimated 175,109 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.

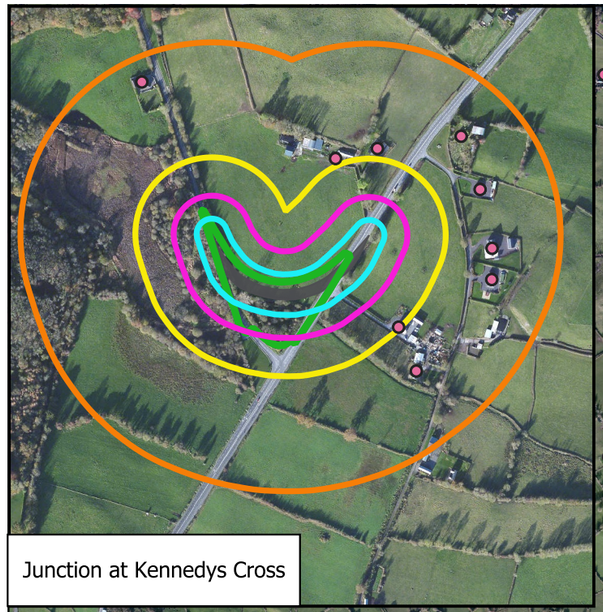
The removal of the topsoil followed by its transportation and deposition at the peat deposition areas during the construction phase will also give rise to dust emissions.

The IAQM 2024 Guidance methodology for the *'Assessment of Dust from Demolition and Construction*', as discussed in Section 10.2.3.3 above, is used to assess the potential risk to sensitive 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 Sensitive Properties were identified using a constraints mapping process, and detailed and updated planning searches which informed the project sensitive receptor dataset. The sensitive properties 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.

- There is 1 no. High Sensitive Properties, which is a Participating Property, within 20m of the Proposed Project footprint;
- There are 4 no. High Sensitive Properties, 1 no. of which is a Participating Property, within 50m of the Proposed Project footprint;
- There are 8 no. High Sensitive Properties, 2 no. of which are Participating Properties, within 100m of the Proposed Project footprint (1 no. of which are located within 100m of the proposed turbine delivery route accommodation works at Kennedys Cross);

- There are 19 no. High Sensitive Properties, 2 no. of which are Participating Properties, within 250m of the Proposed Project footprint (9 no. of which are located within 250m of the proposed turbine delivery route proposed turbine delivery route accommodation works at Kennedys Cross).

Figure 10-3 below displays the above IAQM 2024 Guidance Dust Deposition Bands and the Relevant Sensitive Properties within each band.



0 0.5 1 km

Map Legend

- EIAR Site Boundary
- Proposed Wind Farm Permanent Infrastructure Footprint
- Proposed TDR Accomodation Works at Kennedys Cross
- 20m IAQM Dust Deposition Band
- 50m IAQM Dust Deposition Band
- 100m IAQM Dust Deposition Band
- 250m IAQM Dust Deposition Band
- Sensitive dust receptors

Drawing Title
IAQM Dust Depostion Bands and Relevant Sensitive Properties for Assessment

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
EM	EC
Project No. 200804	Drawing No. Figure 10-3
Scale 1:22,000	Date 2025-10-16

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Table 10-16 below identifies the sensitivity of the area surrounding the development footprint of the Proposed Project to dust soiling effects, as described in Section 10.2.3.3 above. As per the criteria in Table 10-16, the overall sensitivity of the Proposed Project to dust soiling impacts is **'Medium'.** For the construction phase of the Proposed Project, 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 from Proposed Project construction works. 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 Proposed Project site to the health effects of PM_{10}, as described in Section 10.2.4.2 above. The overall sensitivity of the area to human health effects of PM_{10} is considered to be **'Low'.**

As indicated in section 10.2.3.1 above, the Proposed Project is situated in Zone D. According to the 2024 EPA baseline air quality data[17]; the average PM_{10} for Zone D is 11.5µg/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 Project 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/m3 in Scotland)	>10	Low	Low	Low	Low
		1-10				
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 Project site. As noted above in Section 10.2.2.3, a Cutover bog habitat is located within 20m and 50m of the Proposed Project site footprint. The overall sensitivity of the areas surrounding the development footprint of the Proposed Project site is **'Medium'**.

[17] https://www.epa.ie/publications/monitoring--assessment/air/Summary-Tables-2024-for-Zones-A--D-for-upload-with-report-final.xlsx

Table 10-18 Sensitivity of the Proposed Project 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 10.2.3.3 above, the Proposed Wind Farm is classified as 'Large' for Earthworks, Construction and Trackout activities and the Proposed Grid Connection is classified as 'Medium' for Earthworks, Construction and Trackout activities. Therefore, when combined with the sensitivity of the area, using Tables 10-16, 10-17, and 10-18 above as guidance, the pre-mitigation risk of impacts from the Proposed Project summarised in Table 10-19 below.

Table 10-19 Summary Dust Risk Table for Proposed Project Activities

Potential Impact	Risk			
	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	N/A

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

Transportation to and from the Proposed Project site

The transportation of turbine components, supporting infrastructure materials, construction materials and staff, and waste to and from the Proposed Project site will 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 N62 national road, the R345 regional road, the L7002 local road and the L7001 local road, along which the proposed site entrances are located (Section 4.7.1 of Chapter 4), was scoped in for assessment. Beyond either end of these 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 site access along the N62 to the west of the Proposed Project site, 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 section of the N62 scoped in for assessment, is approximately a 3.8km stretch of national road that runs in a north-south

orientation to the west of the Proposed Project site. The section of the R436 scoped in for assessment is approximately 6.7km in length and runs in a southwest- northeast direction south of the Proposed Project site. The section of the L7002 scoped in for assessment runs through the northern portion of the site in a west-east direction for approximately 5.4km. The section of the L7001 scoped in for assessment runs along the northwestern boundary of the Proposed Project site and runs for approximately 4.5km in length.

The IAQM 2024 Guidance as discussed in Section 10.2.3.3 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 3.8km stretch of the N62, the 6.7km stretch of the R436, the 5.4km stretch of the L7001 and the 4.5km stretch of the L7001), 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 10-4 below.

- There are 66 no. High Sensitive Properties located within 20m of the roads identified: 3 no. from the L7001 (1 no. of which is a Participating Property), 7 no. from the L7002, 12 no. from the R436 and 44 no. from the N62 (1 no. of which is a Participating Property).
- There are 220 no. High Sensitive Properties within 50m of the roads identified: 22 no. from the L7001, 32 no. from the L7002, 45 no. from the R436 and 121 no. from the N62.
- There are 303 no. High Sensitive Properties within 100m of the roads identified: 30 no. from the L7001, 42 no. from the L7002, 53 no. from the R436 and 178 no. from the N62.
- There are 499 no. High Sensitive Properties within 250m of the roads identified: 42 no. from the L7001, 63 no. from the L7002, 76 no. from the R436 (2 no. of which are Participating Properties) and 318 no. from the N62.

L7001 Local Road

L7002 Local Road

R436 Regional Road

N62 National Road

0 1 2 km

Map Legend

- EIAR Site Boundary
- R436 Regional Road
- N62 National Road
- L7001 and L7002 Local Road
- 20m IAQM Dust Deposition Band
- 50m IAQM Dust Deposition Band
- 100m IAQM Dust Deposition Band
- 250m IAQM Dust Deposition Band
- Sensitive Dust Receptors

N

Drawing Title

IAQM Dust Deposition Bands and Relevant Sensitive Properties for teh N62, R436, L7002 and L7001 Roads

Project Title

Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
EM	EC
Project No. 200804	Drawing No. Figure 10-4
Scale 1:30,000	Date 2026-10-16

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Table 10-21 below identifies the sensitivity of the area surrounding the roads identified above to dust soiling effects from trackout, as described in Section 10.2.3.3 above.

As per the criteria in Table 10-21 below, there are 66 no. High Sensitive Properties within 20m of the roads identified, i.e., the L7001, L7002, N62 and R436, and 220 no. High Sensitive Receptors within 50m of the roads identified. The overall sensitivity of the area to dust soiling impacts is considered to be '**High**'.

Table 10-21 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 10-22 below identifies the high sensitivity receptors in the area surrounding the identified roads to the health effects of PM_{10}, as described in Section 10.2.2.3 above. The overall sensitivity of the area to human health effects of PM_{10} is considered to be '**Low**'. As indicated in Section 10.2.2.3 above, the Proposed Project is situated in Zone D. According to the 2024 EPA baseline air quality data[18]; the average PM_{10} for Zone D is 11.5µg/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 10-22 Sensitivity of the Area to Human Health Impacts from the transportation of construction plant and vehicles on the identified 1.2km stretch of the l3115 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

[18] *https://www.epa.ie/publications/monitoring--assessment/air/Summary-Tables-2024-for-Zones-A--D-for-upload-with-report-final.xlsx*

As identified in Section 10.2.2.3 above, the Proposed Wind Farm is classified as 'Large' for trackout activities, and the Proposed Grid Connection is classified as 'Medium' for trackout activities. Therefore, when combined with the sensitivity of the area, using Table 10-21 above as guidance, the pre-mitigation risk of impacts from the Proposed Wind Farm and Proposed Grid Connection on the roads identified is summarised in Table 10-24 below.

Table 10-24 Summary Dust Risk Table for the identified roads. i.e. N62, R436, L7001, L7002

Potential Impact	Dust Emission Magnitude	
	Trackout (Proposed Wind Farm)	Trackout (Proposed Grid Connection)
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 roads identified, with no mitigation applied for the major dust generating activities, during the construction phase of the Proposed Wind Farm and Proposed Grid Connection 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 Measures

- A wheel wash facility will be installed on the Proposed Wind Farm at all proposed construction site entrances and will be used by vehicles before leaving the site.
- 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, grid route, road widening sections, substation, and construction compounds and around the borrow pit area to ensure dust does not cause a nuisance.
    - If necessary, such as during periods of dry weather, de-silted water will be taken from stilling ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads, turbine bases, borrow pit and site compounds to prevent the generation of dust where required.
    - Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff as outlined in the CEMP.
- 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 placement areas and restoration of borrow pits.
- Turbines components, construction materials and grid connection infrastructure 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 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.
- 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 dust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the proposed turbine (T14).
- A CEMP will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes dust suppression measures.

Residual Effect

With the implementation of the above, residual effects on air quality from dust emissions and from traffic movements to and from the Proposed Project site during the construction phase will have a short-term, slight, negative effect on air quality.

Significance of Effects

The effects on air quality from dust emissions arising from transportation activities 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

The operational phase of the Proposed Project 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.

LGVs will also be present on site to facilitate amenity access for the local community. Amenity visitors will arrive to the site and park at identified amenity carparks near proposed amenity site entrances (please see Table 4-9 in Chapter 4 for further detail). The anticipated number of LGVs visiting the Proposed Wind Farm during the operational phase (up to a maximum of 40 car trips per day, i.e., 20 cars, based on information from other similar Bord na Móna facilities), spread across carparks located between 650m and 3km from each other will give rise to a long-term, imperceptible, negative impact, which is not significant. See Section 15.1.4.2 in Chapter 15 for further details on traffic movements during the operational phase.

The permanent onsite 220kV substation will be operated and maintained by ESB/EirGrid. 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 impact on air quality, 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, slight negative effect on air quality.

Mitigation 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 on-site 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. The nearest licensed waste facility is located approximately 19.4km southeast of the proposed turbine (T14).
- Amenity carparks are spread out throughout the Proposed Wind Farm thus minimising the potential for traffic delays due to congestion building up at site entrance points and consequently further exhaust emissions.

Residual Effects

Following implementation of the mitigation measures above, residual effects of exhaust emissions for the operational phase of the Proposed Project will have a long-term, imperceptible, negative effect on air quality.

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

As discussed in Section 10.3.3.1, the operational phase of the Proposed Project 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 due to dust emissions, which is not significant.

As discussed above in Section 10.3.3.1 the permanent onsite 220kV substation will be operated and maintained by ESB/EirGrid. 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, which is not significant.

Mitigation 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 on air quality.

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

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, 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, which is not significant. Further details on the carbon dioxide savings associated with the Proposed Project are presented in Section 11.4.3.2 of Chapter 11: Climate.

Mitigation Measures

No mitigation required.

Residual Effect

There will be a long-term, moderate, positive effect on air quality due to the offsetting of approximately 56,375 tCO_2eq per annum (see Chapter 11 for details).

Significance of Effects

The long-term, moderate, positive 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

Whilst the operational phases 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 is considered negligible as the potential for both exhaust and dust emissions will be limited and controlled through mitigation measures (please see Section 10.3.2 and Section 10.3.3 above for detailed mitigation measures).

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 Project will offset the emission of these harmful chemicals produced 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 Measures

No mitigation required.

Residual Effect

No residual effects.

Significance of Effects

The long-term, moderate, positive 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 wind turbines proposed as part of the Proposed Wind Farm are expected to have a lifespan of approximately 35-years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Wind Farm may be decommissioned fully. The decommissioning of the Proposed Wind Farm will be completed in compliance with the requirements of the Rehabilitation Plan for Lemanaghan Bog as appropriate.

The Proposed Grid Connection and proposed onsite 220kV substation will remain in place as it will be under the ownership and control of the ESB Networks and/or EirGrid and will form a permanent part of the national electricity grid. The onsite 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 4.13 of Chapter 4.

A Decommissioning Plan is included as in Appendix 4-8 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 will be similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Wind Farm will be implemented during the decommissioning phase thereby minimising any potential impacts. The potential for effects during the decommissioning phase of the Proposed Wind Farm has been fully assessed in this EIAR.

10.3.5 Cumulative Assessment

Potential cumulative effects on Air Quality between the Proposed Project and other permitted or proposed plans in the area (wind energy or otherwise), as set out in Section 2.10 in Chapter 2 of this EIAR, were also considered as part of this assessment. The developments considered as part of the cumulative effect assessment are described in Section 2.10 of Chapter 2, with relevant developments within 1km of the red line planning application boundary presented in Appendix 2-3; please see Table 2.6 of Chapter 2 for the relevant cumulative assessment boundary justification.

As part of the IPC licence rehabilitation requirements, BnM is required to produce cutaway bog decommissioning and rehabilitation plans, please see Appendix 2-4 to view the draft Cutaway Bog Decommissioning and Rehabilitation Plan for Lemanaghan Bog. These plans have considered the Proposed Project footprint and demonstrate that both peatland rehabilitation and renewable energy can coexist harmoniously onsite. Irrespective of any further development on the site, BnM's statutory duties to discharge the conditions of its IPC Licence will remain ongoing.

The Peatland Climate Action Scheme (PCAS) which comprises enhanced peatland rehabilitation (above and beyond IPC licence requirements). This scheme is in addition to the IPC licence requirements and therefore does not form part of the Proposed Wind Farm application but has been cumulatively assessed.

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 emissions from construction plant and machinery and potential dust emissions associated with the construction activities. However, once the mitigation proposals, as outlined in Section 10.3.2 are implemented during the construction phase of the Proposed Project, there will be no cumulative negative effect on air quality.

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

- Exhaust emissions during the construction of turbines, peat and spoil management areas, substation and all other supporting infrastructure;
- Exhaust emissions through vehicle transit to and from the Proposed Project site;
- Dust emissions during the construction of turbines, peat and spoil management areas, substation and all other supporting infrastructure;
- Dust emissions through vehicle transit to and from the Proposed Project site.

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

In addition to the above, the Proposed Project site will continue to be used for minimal turbary peat cutting activities from private landowners and therefore, vehicles required for access to these areas will continue to utilise the site as required. During the construction phase, there will be a short term, slight, negative effect on air quality due to vehicle exhaust emissions.

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 10.3.2, there will be a long-term, imperceptible, negative effect on air quality from:

- Exhaust emissions from maintenance LGV vehicles visiting the Proposed Project site 1-2 times per day and on occasion more frequent LGV and HGV visits during component or substation infrastructure replacement;
- Exhaust emissions from approx. 20 amenity user LGV vehicles visiting the Proposed Project site per day;
- Dust emissions from maintenance LGV vehicles visiting the Proposed Project site 1-2 times per day and on occasion more frequent LGV and HGV visits during component or substation infrastructure replacement;
- Dust emissions from approx. 20 amenity user LGV vehicles visiting the Proposed Project site per day.

As established above in section 10.3.2, post-mitigation, there will be an overall long-term, moderate, positive effect on Air Quality from:

- The provision of an alternative to electricity derived from coal, oil or gas-fired power stations. The Proposed Project will result in emission savings of 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 impact on air quality due to the offsetting of approximately 56,375 tonnes of CO_2 per annum. Please see Chapter 11 Climate for further details on carbon displacement calculations.

Therefore, it is considered there will be no measurable negative cumulative effects on air quality should other proposed or consented plans 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 air quality.

In addition to the above, the Proposed Project site will continue to be used for minimal turbary peat cutting activities from private landowners and therefore, vehicles required for access to these areas will continue to utilise the site as required. During the operational phase, there will be a short term, imperceptible, negative cumulative effect on air quality due to vehicle exhaust emissions.

10.3.5.3 Decommissioning Phase

The works required during the decommissioning phase are described in Section 4.13 in Chapter 4: Description of the Proposed Project. Any cumulative impact and consequential effect that occurs during the decommissioning phase will be 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 10-20 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