atmos CONSULTING

61253

Environmental Impact Assessment Report

Cummeennabuddoge Wind Farm

Chapter 12: Air and Climate

Cummeennabuddoge Wind (DAC)

September 2024

Contents

Contents

Tables

Figures

List of Technical Appendices

Glossary of Terms

Term	Definition
The Applicant	Cummeennabuddoge Wind Designated Activity Company (DAC)
The Agent	Atmos Consulting Limited
Environmental Advisors and Planning Consultants	Atmos Consulting Limited
Environmental Impact Assessment	A means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development
Environmental Impact Assessment Regulations	Schedule 6 of the Planning and Development Regulations 2001(as amended)
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations
The Proposed Development	Cummeennabuddoge Wind Farm
The Proposed Development Site	The land enclosed by the red line shown on Figure 1-1a
The Planning Act	Directive 2011/92/EU (as amended by Directive 2014/52/EU, the EIA Directive).

List of Abbreviations

Abbreviation	Description
AQA	Air Quality Assessment
AQG	Air Quality Guideline
CAFE	Cleaner Air For Europe
CAP	Climate Action Plan
CO	Carbon Monoxide
CO_2	Carbon Dioxide
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
HDV	Heavy Duty Vehicles
HGV	Heavy Goods Vehicles
IAQM	Institute of Air Quality Management
IT	Interim Targets
NO_2	Nitrogen Dioxide
OTD	Overarching Technical Document'
PM	Particulate Matter
SAC	Special Area of Conservation
SO_2	Sulphur Dioxide
SSSI	Sites of Special Scientific Interest
TII	Transport Infrastructure Ireland
WHO	World Health Organization
WMO	World Meteorological Organisation

12 Air and Climate

12.1 Introduction

This chapter of the EIAR assesses the potential impact on air quality and climate as a result of the construction, operation and decommissioning of the Proposed Development. The Proposed Development is described in full in Chapter 4 of this EIAR.

The relevant policy context and methods used to assess the potential effects are described together with the baseline conditions that exist in the area in the absence of the Proposed Development.

Potential effects of the Proposed Development are discussed, where negative effects are predicted, the chapter identifies appropriate mitigation. Residual effects, and possible cumulative effects of the Proposed Development in combination with other developments are then assessed.

12.1.1 Statement of Authority

This chapter has been prepared by Atmos Consulting Limited. Atmos has substantial air and climate assessment experience having prepared Air and Climate chapters for multiple permitted and proposed developments which have been subject to EIA.

Malcolm Sangster (overall Project Director and technical lead for this assessment). Malcolm has 27 years' experience in environmental management including 15 years in delivering consents and EIAs for energy projects. This includes a diverse technical knowledge and experience of managing and directing complex projects. Malcolm has a BSc (Hons) Chemistry, and a MSc Environmental Chemistry.

Malcolm has undertaken air quality assessments for a diverse range of projects that have included assessing and recommending mitigation for dust and particulate releases from construction activities. Malcolm is also an expert in determining the total greenhouse gas emissions arising as a result of projects and products through using Life Cycle Analysis tools and methods.

Since 2020 Malcolm has directed 15 large and small scale Windfarm projects including overseeing the delivery of full EIARs and consent applications.

Jack Graham. (Assistant Project Manager). Jack has 2 years' experience in supporting the delivery of EIAs and has a Masters degree in Environmental Management (Energy). Jack has compiled EIA Chapters including Air and Climate for other windfarms including significant experience in carbon balance assessments for upland windfarms using the Scottish Government's Carbon Calculator.

12.2 Methodology and Approach

12.2.1 Legislation, Planning Policy and Guidance

The following section sets out the policy and guidance which is considered to be of relevance to an assessment of effects on air and climate for a proposed development of this type.

Directive 2004/107/EC of the European Parliament and of the Council was originally published in December 2004.

The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was originally published in May 2008.

The CAFE directive (2008/50/EC) incorporates revised standards for Sulphur dioxide (SO_2), Lead (Pb), Nitrogen dioxide (NO_2), Ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), Benzene (C_6H_6) and Carbon monoxide (CO).

Commission Directive (EU) 2015/1480 amended several annexes to Directives 2004/107/EC and 2008/50/EC.

The CAFE Fourth Daughter Directive was transposed into Irish legislation by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016 (S.I. No. 659/2016).

The CAFE Directive has been transposed into Irish Legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) (ISB, 2011).

The Air Quality Standards Regulations 2011 have subsequently been revoked and superseded by the Ambient Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022).

The limit values of the Air Quality Standards Regulations 2022 are set out in Table 12-1. Limit values are presented in micrograms per cubic metre (µg/m^3). 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.

Table 12-1: Upper Assessment Thresholds of Air Quality Standards Regulations 2022

Pollutant	Limit Value Objective	Averaging Period	Upper Limit Value (µg/m^3)	Application of Limit Value
Sulphur Dioxide (SO_2)	Protection of human health	24 hours	125	60% of 24-hour limit value not to be exceeded more than 3 times in any calendar year
	Protection of vegetation	1st Oct to 31st March	20	Not to exceed 60% of Winter limit value
Nitrogen dioxide (NO_2) and oxides of Nitrogen	Protection of human health	1 hour	200	70% of limit value not to be exceeded more than 18 times in any calendar year
		Annually	40	80% of limit value

Pollutant	Limit Value Objective	Averaging Period	Upper Limit Value (µg/m³)	Application of Limit Value
				as an annual mean
	Protection of vegetation	Annually	30	80% of limit value as an annual mean
Fine particles (PM_{10})	Protection of human health	24 hours	50	70% of limit value not to be exceeded more than 35 times in any calendar year
		Annually	40	70% of limit value as an annual mean
Fine particles ($PM_{2.5}$)	Protection of human health	Annually	25	70% of limit value as an annual mean
Lead (Pb)	Protection of human health	Annually	0.5	70% of limit value as an annual mean
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	70% of limit value as an 8-hour average
Benzene (C_6H_6)	Protection of human health	Annually	5	70% of limit value as an annual mean
Ozone (O_3)	Protection of human health	Maximum daylight 8 hour running average	120	Limit value not to be exceeded on more than 25 days per calendar year averaged over three years
	Protection of vegetation	*AOT_{40} calculated from 1 hour values from May to July	6,000	Averaged over 5 years

Source: ISB, 2022.

*AOT_{40} is a measure of the overall exposure of plants to Ozone. It is the sum of the excess hourly concentrations greater than 80µg/m³ and is expressed as µg/m³ hours.

Unlike the other pollutants shown in Table 12-1, $PM_{2.5}$ and Ozone do not have an upper or lower assessment threshold. $PM_{2.5}$ has a single limit value regardless of upper of lower assessment thresholds. Ozone has only the single target threshold shown.

World Health Organisation (WHO) Guidelines

The EU air quality standards provide a minimum level of health protection, but air quality guidelines levels published in the latest World Health Organisation (WHO) report (WHO, 2021) indicate that human health impacts occur at air pollution levels lower than the current ambient air quality limits as outlined in Table 12-1.

The report (WHO, 2021) breaks the air quality levels down into four interim targets (IT) identified as, IT1, IT2, IT3 and IT4. In line with Ireland's latest Air Quality Strategy (Government of Ireland, 2023), the Strategy commits the State to achieving IT3 levels by 2026, IT4 levels by 2030 and achievement of the final levels by 2040.

To ensure these improvements and targets are met, the EU is revising the limit values set under the CAFE Directive, taking the WHO Guidelines into consideration.

Clean Air Strategy For Ireland

The Clean Air Strategy for Ireland (Government of Ireland, 2023) encompasses seven strategic frameworks that are used to ensure air quality in Ireland continues to improve in line with current targets, policies and legislation.

It summarises the current updates on key strategies aimed towards meeting air quality related Sustainable Development Goals, Clean Air Ambition Actions and Assessment Thresholds for ambient air quality, as well as providing updates on the current status of air quality in Ireland.

IAQM - Guidance on the assessment of dust from demolition and construction (January 2024, Version 2.2)

The Institute of Air Quality Management (IAQM) published Guidance on the assessment of dust from demolition and construction (IAQM, 2024). This guidance is designed to provide a framework for developers, consultants and environmental health practitioners on how to undertake a construction dust impact assessment.

Climate Action Plan 2023

The Climate Action Plan 2023 (CAP23) published by the Irish Government sets out targets for Ireland to halve emissions by 2030 and reach net zero no later than 2050. The plan aims to increase the proportion of renewable electricity in Ireland's grid mix to 80% by 2030. This translates into a target of 9GW of onshore wind, which the Proposed Development will contribute towards.

Local Policy

Relevant local planning policies are derived from the following:

- Kerry County Development Plan 2022-2028; and
- Cork County Development Plan 2022-2028.

Detail on planning policy can be found in the Planning Statement.

12.2.2 Air Quality Zones

The Environmental Protection Agency (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; and
- Zone D: Remainder of the country.

These zones have been defined in order to meet the air quality monitoring, assessment and management criteria as described in Directive (2015/1480) and fourth Daughter Directive (2004/107/EC).

The Proposed Development is situated within Air Quality Zone D, due to its rural location away from population centres.

12.2.3 Climate Change

The potential impact of the Proposed Development on climate is assessed primarily by demonstrating that the wind farm aligns completely with the provisions set out in the national Climate Action Plan 2023.

In order to demonstrate that the carbon savings will significantly outweigh any potential carbon losses a methodology made available by the Scottish Government (2019) in tabular spreadsheet format titled '*Carbon Calculator Tool v1.7.0*' has been used to assess the Proposed Development.

This 'Carbon Calculator' is the Scottish Government's tool provided to support the process of determining the carbon impact of wind farm developments in Scotland. The purpose of the tool is to assess, in a comprehensive and consistent way, the carbon impact of wind farm developments. This is done by comparing the carbon costs of wind farm developments with the carbon savings attributable to the wind farm.

There is no comparable Irish version of the Carbon Calculator Tool. Therefore, it is considered appropriate to adopt the Scottish methodology which has been tried and tested and subject to audit by the Scottish Environmental Protection Agency.

The results of the Carbon Calculator Tool are shown in section 12.5 and the results discussed in section 12.6. Additionally, the parameters entered into the Carbon Calculator Tool are shown in Technical Appendix 12-1.

The full Proposed Turbine Range has been assessed using the Carbon Calculator Tool utilising two scenarios, scenario one at 6MW generation per turbine and scenario two at 7.2MW generation per turbine. This allows the Carbon Calculator Tool to determine the total energy generation, and therefore the carbon savings attributable to the Proposed Development across the full Proposed Turbine Range.

The carbon calculator does not require any further information on the other aspects of the Proposed Turbine Range such as turbine tip height, rotor diameter or hub height as these are not material considerations which affect the total carbon calculation.

12.2.4 Consultation

Transport Infrastructure Ireland (TII) as part of their scope of assessments consultation response in 2021 specified guidance with which regard should be given to during the writing of the EIAR.

Much of TII's response is not relevant to this Chapter and instead will be taken into consideration within Chapter 7: Traffic and Transport.

The aspects of TII's response which is relevant to this Chapter is the following:

> *"The developer, in preparing the EIAR, should have regard to TII's Environmental Assessment and Construction Guidelines, including the Guidelines for the*

Treatment of Air Quality During the Planning and Construction of National Road Schemes (National Roads Authority, 2006),"

TII's 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes.' as of when this Chapter was written in November 2023 this document was no longer available online.

TII was contacted regarding the status of the Environmental Assessment and Construction Guidelines, including the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes. TII responded to the consultation on 26/01/2024 and stated the following:

"The 2011 guidelines have been superseded and replaced with the following standard PE-ENV-01107".

TII's reference to "2011 Guidelines" is the 8th May 2011 (Revision 1) update to the 2006 Environmental Assessment and Construction Guidelines, including the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes, which previously superseded the original 2006 release but has now been superseded itself by PE-ENV-01107.

In addition to 'PE-ENV-01107 – Air Quality Assessment of Proposed National Roads – Standard' (SD), TII has also released 'PE-ENV-01106 Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document' (OTD) (TII, 2022b; TII 2022a).

The start of 'PE-ENV-01106' lays out the scope with regards to both 'PE-ENV-01106' and 'PE-ENV-01107' and it states the following:

"To outline the application of Air Quality Assessment (AQA) during the planning of proposed national road schemes, motorway service areas, toll schemes, and any associated infrastructure." (TII, 2022a).

In addition it states:

"PE-ENV-01106 sets out the approach of AQA to all TII projects, whilst the Standards Document PE-ENV-01107 sets out the required standards for proposed National Roads, motorway service areas, and toll schemes. They are applicable to Projects which are funded through TII and/or where TII is the Approving Authority." (TII, 2022a).

Subsequently, 'PE-ENV-01106' and 'PE-ENV-01107' are not deemed relevant to this Chapter and are discounted from further assessment as the Proposed Development does not fulfil any of the above applicability criteria.

However, both 'PE-ENV-01106' and 'PE-ENV-01107' extensively reference United Kingdom air quality guidance 'The Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction Version 1.1' throughout for calculating the effects of dust on sensitive receptors.

In addition, 'PE-ENV-01106' and 'PE-ENV-01107' state the following:

"It should be noted that where UK based guidance is referred to within the SD and OTD this is in the absence of equivalent Irish guidance."

IAQM has released more recent guidance updates to the 2014 version (IAQM, 2024). As such, the most recent IAQM Guidance on the assessment of dust from demolition and construction Version 2.2 (IAQM, 2024) has been followed in this Chapter for assessing the effects of dust on sensitive receptors.

12.2.5 Assessment Methodology

The structure of this Air and Climate chapter is as follows:

- Assessment Methodology and Significance Criteria;
- Baseline Conditions both Regional and National;
- Assessment of impacts to air and climate associated with the Proposed Development during the construction, operation and decommissioning phases;
- Mitigation measures to avoid or reduce the impacts identified;
- Assessment of residual impact caused by the Proposed Development after usage of mitigation measures; and
- Assessment of cumulative impacts.

12.2.6 Significance Criteria

The significance criteria for this chapter are defined as the following:

Any impact above low is deemed significant. Medium and high impacts are therefore significant impacts.

12.3 Baseline Conditions

12.3.1 Global Climate

Every year, the World Meteorological Organisation (WMO) issues a Statement on the State of the Global Climate (WMO, 2023). It is based on data provided by National Meteorological and Hydrological Services and other national and international organisations. Some of the key messages in the WMO Statement of the State of the Climate 2022 are as follows:

- "Global mean temperature in 2022 was 1.15 [1.02-1.28) °C above the 1850-1900 average. The years 2015 to 2022 were the eight warmest in the 173-year instrumental record. The year 2022 was the fifth or sixth warmest year on record, despite ongoing La Nina conditions. "
- "Concentrations of the three main greenhouse gases – carbon dioxide, methane and nitrous oxide – reached record highs in 2021, the latest year for which consolidated global values are available (1984-2021). The annual increase in methane concentration from 2020 to 2021 was the highest on record. Real-time data from specific locations showed that levels of the three greenhouse gases continued to increase in 2022."

12.3.2 Regional Climate

Average air temperature for the site has been taken from the closest available data located at Cork Airport (Met Éireann, 2023). This monitoring station has recorded the average air temperature from January 2020 to October 2023 as 10.44°C.

12.3.3 National Air Quality

Ireland is recognised as having some of the best air quality in Europe (EEA, 2023). However under certain weather conditions it is possible to experience air pollution in the larger urban centres.

The most recent published report on air quality in Ireland is the 'Air Quality in Ireland 2021' report published by the Environmental Protection Agency (EPA) in 2022. This report provides an overview of the ambient air quality in Ireland in 2021 (EPA, 2022).

It is based on monitoring data from up to 87 stations across Ireland, dependant on the pollutant monitored (See Table 12-3). The measured concentrations are compared with both EU legislative standards and WHO air quality guidelines for a range of air pollutants (WHO, 2021).

The Air Quality in Ireland 2021 report states in 2021 Ireland met all of its legally binding EU CAFE requirements for air pollution levels. However, Ireland would not have met the new WHO air quality guideline (AQG) levels for health in 2021. These guidelines are not legally binding however Ireland should move towards achieving these guidelines (EPA, 2022).

According to the Air Quality in Ireland 2021 report there have been the following exceedances related to the WHO AQG:

Table 12-2: Selected pollutants measured in 2021 failing the WHO AQG Levels

Pollutant	Number of Stations Monitored	WHO Air Quality Guideline (AQG) Exceedences
PM_{10}	87	Above annual limit at 8 stations. Above daily limit at 21 stations.
$PM_{2.5}$	81	Above annual limit at 65 stations. Above limit value at 61 stations.
NO_2	30	Above annual or 24 hour limit at 23 stations.
Ozone (O_3)	21	Above limit at 19 stations.
Sulphur dioxide (SO_2)	15	Above 24 hour limit at 1 station.
PAHs	5	Above the European Environment Agency reference limit at 3 stations.

Source: EPA, 2022

12.3.4 Regional Air Quality

The Proposed Development is located almost entirely within County Kerry, although a portion of the grid connection cabling is proposed within County Cork.

Due to the Proposed Development's rural location 17.5km away from the nearest urban area (Killarney) and the siting of the nearest turbines being c.2.3km from the nearest major road (N22), it is considered that these are the major sources of the identified air quality pollutants likely to affect the site.

The closest monitoring site to the Proposed Development within the same air quality zone is Macroom. $PM_{2.5}$ and PM_{10} pollution are monitored at Macroom. Results from the monitoring undertaken at Macroom have been summarised in the 2023 Air Quality Bulletin. The results show there have been no exceedances of PM_{10} at Macroom in 2023 (EPA, 2023a).

- The annual mean PM_{10} and $PM_{2.5}$ levels for Macroom were 16.18µg/m^3 and 11.06µg/m^3 respectively from 01/01/2022 until 31/12/2022 (EPA, 2023b). These values are below the limit values set out by the Air Quality Standards Regulations 2022 as per Table 12-1. However, these are above the World Health Organization (WHO)

guidelines of 15 µg/m3 annual mean for PM_{10} and 5 µg/m3 annual mean for $PM_{2.5}$. (WHO, 2021).

12.4 Dust Assessment

In accordance with Guidance on the assessment of dust from demolition and construction (IAQM, 2024), a staged approach to the assessment of the impacts of dust from construction activities has been conducted.

The following dust assessment has been broken down into sections of assessment in line with the IAQM Guidance (IAQM, 2024). The assessment is laid out as the following:

- **12.4.1 Screening Receptors** – This section screens the need for a detailed dust assessment and identifies sensitive receptors in proximity to the Proposed Development which fulfil the screening criteria and therefore require to be assessed in greater detail;
- **12.4.2 Dust Emission Magnitude of the Proposed Development** – This section identifies the four dust generating activities (construction, earthworks, trackout, decommissioning) of the Proposed Development and assesses their potential magnitude of dust emission based on the nature of the Proposed Development;
- **12.4.3 Classifying Receptor Sensitivity** – This section consists of multiple subsections (detailed below) which identify the sensitivity of each individual sensitive receptor (identified in section 12.4.1) to the effects of dust soiling and PM_{10};
  - Human Receptor Sensitivity to Dust Soiling Effects – This subsection classifies the sensitivity level the human sensitive receptor (identified in section 12.4.1) to the effects of dust soiling, namely the effects of dust on the amenity on the sensitive receptor;
  - Combined Overall Sensitivity of the Human Sensitive Receptor to Dust Soiling Effects – This subsection uses the results of table 12-6 and compares them against the IAQM sensitivity matrix in table 12-7. This results in a combined overall sensitivity for the human sensitive receptor to the effects of dust soiling, broken down per activity;
  - Human Receptor Sensitivity to the Health Effects of PM_{10} – This subsection classifies the sensitivity level of the human sensitive receptor (identified in section 12.4.1) to the health effects of PM_{10} caused by dust emissions;
  - Combined Overall Sensitivity of the Human Sensitive Receptor to the Effects of PM_{10} – This subsection uses the results of table 12-8 and compares them against the IAQM sensitivity matrix in table 12-9. This results in a combined overall sensitivity for the human sensitive receptor to the effects of PM_{10}, broken down by activity;
  - Ecological Receptor Sensitivity to the Effects of Dust Soiling – This subsection classifies the sensitivity level of the ecological sensitive receptor (identified in section 12.4.1) to the ecological effects of dust soiling, namely the effects dust soiling can have on sensitive habitats and plant communities;
  - Overall Sensitivity of the Ecological Sensitive Receptor to Dust Soiling Effects – This subsection uses the results of table 12-10 and compares them against the IAQM sensitivity matrix in table 12-11. This results in an overall sensitivity for the ecological sensitive receptor to the effects of dust soiling, broken down by activity;

  - Summary of the Overall Sensitivity of Human and Ecological Sensitive Receptors – This subsection provides a summary in table 12-12 of the previous combined overall results of sensitive receptor sensitivity in tables 12-7, 12-9 and 12-11 in order to improve readability;
- **12.4.4 Risk Matrices for the Impacts of Dust on Human and Ecological Sensitive Receptors** – This section contains 4 risk matrices, one for each activity. These risk matrices are used in section 12.4.5 below in order to determine overall risk of dust impacts on the sensitive receptors, broken down by activity;
- **12.4.5 Overall Risk of Dust Impacts on Sensitive Receptors without Mitigation** – This section presents the overall risk (in Table 12-16) of dust impacts on the sensitive receptors previously identified in section 12.4.1. It uses the results of Table 12-5 and Table 12-12 in sections 12.4.1 and 12.4.3 respectively and compares them against the four risk matrices in section 12.4.4 in order to provide an assessment of overall risk of dust impacts without mitigation, broken down by activity; and
- **12.4.6 Additional Factors of Consideration** – This section, in line with IAQM Guidance details other considerations for the potential impact of dust on sensitive receptors which haven't already been included in the dust assessment but should be considered alongside the overall results of Table 12-16 in section 12.4.5.

12.4.1 Screening Receptors

The IAQM guidance lists the following criteria which should be considered when screening the need for a detailed dust assessment:

Box 1: Screening criteria

An assessment will normally be required where there is:

- a 'human receptor' within:
  - 250 m of the boundary of the site; and/or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

- an 'ecological receptor' within:
  - 50 m of the boundary of the site; and/or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

For specific (high risk) schemes the planning authority may require dust assessment despite the proposed site falling outside the distances above.

Source: (IAQM, 2024)

It is important to note, the screening criteria refers to the 'boundary of the site' which when applied to the Proposed Development would correspond to the Proposed Development (redline) Boundary, shown as the 'Site Boundary' on Figure 1-2.

The screening criteria of this dust assessment has been defined by the parameters within "Box 1: Screening Criteria" (IAQM, 2024) and subsequently all receptors within this area have been included in the assessment as sensitive receptors (shown in Table 12-14 below and on Figure 12-1).

However, the Proposed Development will not experience works throughout the entirety of the Proposed Development Boundary, it will instead occur on and beside site infrastructure within the boundary which can also be found within Figure 1-2. As can be seen from this figure, some sections of the Proposed Development will see no infrastructure built, and subsequently no construction, operational or decommissioning activity within hundreds of meters, such as the ground between turbines 10 and 12/13, these areas (including the Proposed Development Boundary) will not produce dust emissions.

As noted in the IAQM Guidance, the parameters within "Box 1: Screening Criteria" are deliberately conservative.

As such, the assessment of potential effects from the Proposed Development on these sensitive receptors will be taken from the nearest infrastructure works as shown on Figure 1-2.

Human sensitive receptors are defined as "Any location where a person or property may experience the adverse effects of airborne dust or dust soiling." (IAQM, 2024). These include but are not limited to:

- Dwellings;
- Museums and Galleries (Cultural Heritage Collections);
- Vehicle Showrooms;
- Food Manufacturers;
- Electronics Manufacturers;
- Amenity Areas; and
- Horticultural Operations.

Ecological sensitive receptors are defined as:

> *"..any sensitive habitat affected by dust soiling. This includes direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats). For locations with a statutory designation, e.g. Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs), consideration should be given as to whether the particular site is sensitive to dust and this will depend on why it has been designated. Some non-statutory sites (i.e local wildlife sites) and/or locations with very specific sensitivities may also be considered if appropriate. This inclusion or exclusion of sites should be justified in the assessment."* (IAQM, 2024).

Table 12-3 below shows a list of sensitive receptors which fulfil the parameters shown within "Box 1 – Screening Criteria" and therefore require a detailed dust assessment. These sensitive receptors can also be found on Figure 12-1.

Table 12-3: Sensitive Receptors

Sensitive Receptor (Receptor Type)	Location (ITM)	Proposed Works within Screening Buffer proximity*
Dwelling 1 (Human Sensitive Receptor)	514031, 581759	94m – new track
Dwelling 2 (Human Sensitive Receptor)	519142, 583765	No Infrastructure within 250m – Only the redline boundary
Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment – Special Area of Conservation (SAC) and Proposed Natural Heritage Area (Ecological Sensitive Receptor)	518525, 583732 (closest point)	26m – existing track

*Approximate distances.

**See Box 1: Screening Criteria in Section 12.4.1 for screening buffer distances depending on receptor type.

Dwelling 1 and Dwelling 2 are within 250m of the boundary of the Proposed Development and Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (from now on referred to as Killarney National Park) is within 50m of the Proposed Development.

As the Proposed Development (redline) Boundary does not have any proposed works associated with it, it is not considered as a dust source in this assessment. As Dwelling 2 is only within 250m of the Proposed Development Boundary and not within 250m of any proposed works and associated dust generation, Dwelling 2 is therefore discounted from further assessment.

Dwelling 1 and Killarney National Park are within 250m of proposed works and are therefore classified as sensitive receptors and must be further considered in the detailed dust assessment which follows.

12.4.2 Dust Emission Magnitude of the Proposed Development

As identified within the IAQM Guidance, there are four distinct activities which occur during the construction, operational and decommissioning phases which have the potential to release dust into the atmosphere. These four phases are construction, earthworks, trackout and decommissioning (IAQM, 2024). Specifically in regard to this dust assessment and in line with the IAQM Guidance, these terms are defined as the following:

Construction

> *"Any activity involved with the provision of a new structure (or structures), its modification or re-furbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc."* (IAQM, 2024).

Earthworks

> *"Covers the processes of soil-stripping, ground-levelling, excavation and landscaping."* (IAQM, 2024).

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. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site."* (IAQM, 2014).

Decommissioning

> *"Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time."* (IAQM, 2024).

Table 12-4 shows the potential dust emission magnitude for the Proposed Development which has been broken down into these four categories of differing dust generating activities. The reasons for why each magnitude was chosen are discussed below.

Table 12-4: Dust Emission Magnitude

Activity	Dust Emission Magnitude
Construction	Medium
Earthworks	Large
Trackout	Large
Decommissioning	Medium

Due to the nature of the Proposed Development being primarily composed of wind turbines with no large buildings being proposed, the criteria of defining dust emission magnitude by building volume for the construction and decommissioning phases (referred to as demolition in the IAQM guidance) is difficult to apply. Instead, the other criteria listed in the IAQM Guidance for these phases have been used to more accurately define magnitude (IAQM, 2024).

Construction

As no on-site concrete batching or sandblasting will occur, but concrete will be used on site, and with a construction period of 24 months a magnitude of medium has been selected as accurately representing the likely scale of dust emission as a result of the Proposed Development during the construction phase.

Earthworks

The Proposed Development's dust emission magnitude of earthworks is classified as large as over 110,000 m^2 of material will be moved. For more information see Chapter 10: Soils, Geology and Hydrogeology.

Trackout

The Proposed Development's dust emission magnitude for trackout is classified as large, as although there will be a maximum of between 20-50 HGV movements in any one day in line with a medium emission magnitude, there is over 100m of unpaved road length on the Proposed Development. For more information see Chapter 4: Description of Development and Chapter 7: Traffic and Transport.

Decommissioning

The Proposed Development is classified as a medium sized development for decommissioning as although the total site area is over 75,000m^2, the materials handled during decommissioning do not have a high likelihood of generating dust (for example, metal turbine blades). Concrete structures will also be left in place during the decommissioning phase minimising dust, for more information see Chapter 4: Description of Development.

12.4.3 Classifying Receptor Sensitivity

Human Receptor Sensitivity to Dust Soiling Effects

Table 12-5 shows sensitivity of human sensitive receptors (people and their property) to dust soiling effects. The reasons for why each sensitivity was chosen are discussed below table 12-5.

Table 12-5: Human Receptor Sensitivity to Dust Soiling Effects

Sensitive Receptor Name	Receptor Sensitivity to Dust Soiling
Dwelling 1	High

Dwelling 1 is classified as a high sensitivity receptor to dust soiling as residents can reasonably expect to enjoy a high level of amenity at their residence, the appearance of their property would be diminished by dust soiling and it is reasonably expected for someone to be present either continuously or at least regularly for extended periods (IAQM, 2024).

Combined Overall Sensitivity of the Human Sensitive Receptor to Dust Soiling Effects

Table 12-6 shows the sensitivity matrix of the human sensitive receptor to dust soiling effects. The sensitive receptor and its sensitivity outlined above in Table 12-5 will be compared against this matrix and under each separate activity (Construction, Earthworks, Trackout, Decommissioning), in order to determine an overall sensitivity of the area surrounding the Proposed Development

Table 12-6: Sensitivity Matrix of the Human Sensitive Receptor to Dust Soiling Effects

Receptor Sensitivity	Number of Sensitive Receptors	Distance from the Source (metres)			
		<20m	<50m	<100m	<250m
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

Source: (IAQM, 2024)

Dwelling 1 as shown in Table 12-5 has a high sensitivity to dust soiling effects.

As shown in Table 12-3 Dwelling 1 is located 94m away from the nearest dust source (new track).

Construction

Dwelling 1 is located 94m away from new track. Therefore Table 12-6 places Dwelling 1 into the overall low sensitivity category for dust soiling during construction activities.

Therefore, the overall human sensitive receptor sensitivity to dust soiling effects from construction activities is **low.**

Earthworks

Dwelling 1 is located 94m away from new track. Therefore Table 12-6 places Dwelling 1 into the overall low sensitivity category for dust soiling during earthworks.

Therefore, the overall human sensitive receptor sensitivity to dust soiling effects from earthworks activities is **low**.

Trackout

Dwelling 1 is located 94m away from new track. Therefore Table 12-6 places Dwelling 1 into the overall low sensitivity category for dust soiling during trackout.

Therefore, the overall human sensitive receptor sensitivity to dust soiling effects from trackout is **low**.

Decommissioning

As all access track will remain in place during the decommissioning phase, it has been discounted as a dust source of significance for the decommissioning activities.

There are no other proposed works located within 250m of Dwelling 1.

Therefore, the overall human sensitive receptor sensitivity to the dust soiling effects from decommissioning activities is **negligible**.

Human Receptor Sensitivity to the Health Effects of PM_{10}

Particulate matter less than ten micrometres in size (PM_{10}) can enter the respiratory system which increases the risk of respiratory and cardiovascular disorders. The main sources of primary PM_{10} are incomplete burning of fossil fuels such as coal, oil and peat and emissions from road traffic, in particular diesel engines. Other sources of particulates include re-suspended dust from roads. Natural particulate matter includes sea-salt and organic materials such as pollens.

Table 12-7 shows the sensitivity of human receptors to the health effects of PM_{10}. The reasons for why each sensitivity was chosen are discussed below table 12-7.

Table 12-7: Human Receptor Sensitivity to the Health Effects of PM10

Sensitive Receptor Name	Receptor Sensitivity to PM10
Dwelling 1	High

Dwelling 1 is classified as a high sensitivity receptor to PM_{10} as it is a residential property. It is also reasonably expected for someone to be located there for more than eight hours in a day (IAQM, 2024).

Combined Overall Sensitivity of the Human Sensitive Receptors to the Effects of PM_{10}

Table 12-8 shows the sensitivity matrix of the human sensitive receptor to effects of PM_{10}. The receptor is compared against this matrix and under each separate activity (Construction, Earthworks, Trackout, Decommissioning) below.

Table 12-8: Sensitivity Matrix of the Human Sensitive Receptor to the Effects of PM10

Receptor Sensitivity	Annual Mean PM10 Concentration	Number of receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	>32 µg/m3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32µg/m3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32µg/m3	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/m3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Source: (IAQM, 2024)

As shown in Section 12.3.4 above, the annual mean PM_{10} levels for Macroom (closest monitoring station to the Proposed Development) were 16.18µg/m^3 in 2022.

Dwelling 1 as shown in Table 12-7 has a high sensitivity to the health effects of PM_{10}.

As shown in Table 12-3 Dwelling 1 is located 94m away from the nearest PM_{10} source (new access track).

Construction

Table 12-8 places Dwelling 1 into the overall low sensitivity category for the health effects of PM_{10} from construction activities.

Overall the human sensitive receptor sensitivity to the health effects of PM_{10} from construction activities is **low**.

Earthworks

Table 12-8 places Dwelling 1 into the overall low sensitivity category for the health effects of PM_{10} from earthworks activities.

Overall, the human sensitive receptor sensitivity to the health effects of PM_{10} from earthworks activities is **low**.

Trackout

Table 12-8 places Dwelling 1 into the overall low sensitivity category for the health effects of PM_{10} from trackout.

Overall the human sensitive receptor sensitivity to the health effects of PM_{10} from trackout is **low**.

Decommissioning

As all access track will remain in place during the decommissioning phase, it has been discounted as a dust source of significance for the decommissioning activities.

There are no other proposed works located within 250m of Dwelling 1.

Therefore, the overall human sensitive receptor sensitivity to the dust soiling effects from decommissioning activities is **negligible**.

Ecological Receptor Sensitivity to Dust Soiling Effects

Table 12-9 shows the sensitivity of the ecological sensitive receptor to dust soiling effects. The reasons for why the sensitivity was chosen are discussed below the table.

Table 12-9: Ecological Receptor Sensitivity to Dust Soiling Effects

Sensitive Receptor Name	Receptor Sensitivity to Ecological Effects
Killarney National Park	High

Killarney National Park is classified as a high sensitivity ecological receptor as it is designated as a Special Area of Conservation and contains the vascular plant Killarney Fern (*Trichomanes speciosum*) which is sensitive to dust soiling and can be found in 'The Irish Red Data Book – 1 Vascular Plants' (NPWS, 1988).

Overall Sensitivity of the Ecological Sensitive Receptor to Dust Soiling Effects

Table 12-10 below shows the sensitivity matrix of the ecological sensitive receptor to dust soiling effects. The receptor will be compared against this matrix and under each separate activity (Construction, Earthworks, Trackout, Decommissioning) below.

Table 12-10: Sensitivity Matrix of the Ecological Sensitive Receptor to Dust Soiling Effects

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

Source: (IAQM, 2024)

Killarney National Park as shown in Table 12-9 has a high sensitivity to the ecological effects of dust soiling.

As shown in Table 12-3 Killarney National Park is located 26m away from the nearest dust source (existing track).

Construction

Table 12-10 places Killarney National Park into the overall medium sensitivity category for the ecological impacts of dust soiling from construction activities.

The overall the ecological sensitive receptor sensitivity to dust soiling effects from construction activities is **medium**.

Earthworks

Table 12-10places Killarney National Park into the overall medium sensitivity category for the ecological impacts of dust soiling from construction activities.

The overall the ecological sensitive receptor sensitivity to dust soiling effects from construction activities is **medium**.

Trackout

Table 12-10 places Killarney National Park into the overall medium sensitivity category for the ecological impacts of dust soiling from trackout.

Overall the ecological sensitive receptor sensitivity to dust soiling effects from trackout is **medium**.

Decommissioning

As all access track will remain in place during the decommissioning phase, it has been discounted as a dust source of significance for the decommissioning activities.

There are no other proposed works located within 250m of Killarney National Park.

Overall the ecological sensitive receptor sensitivity to dust soiling effects from decommissioning activities is **negligible**.

Summary of the Combined Overall Sensitivity of Human and Ecological Sensitive Receptors

Table 12-11 below shows a summary the overall sensitivity of the Human and Ecological sensitive receptors. It summarises the findings taken from the above Table 12-6, Table 12-8 and Table 12-10 within section 12.4.3.

Table 12-11: Summary of the Combined Overall Sensitivity of the Human and Ecological Sensitive Receptors

Potential Impact	Activity			
	Construction	Earthworks	Trackout	Decommissioning
Dust Soiling	Low	Low	Low	Negligible
Human Health	Low	Low	Low	Negligible
Ecological	Medium	Medium	Medium	Negligible

12.4.4 Risk Matrices for the Impacts of Dust on Human and Ecological Sensitive Receptors

Table 12-12, Table 12-13, Table 12-14 and Table 12-15 are risk matrices for determining the overall risk of dust impacts from the Proposed Development on the sensitive receptors. These risk matrices have been applied in the following section 12.4.5 in order to determine overall risk for dust impacts.

Risk Matrix of Dust Impacts – Construction

Table 12-12: Risk Matrix of Dust Impacts - Construction

Sensitivity of Receptors	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

Source: (IAQM, 2024)

Risk Matrix of Dust Impacts – Earthworks

Table 12-13: Risk Matrix of Dust Impacts - Earthworks

Sensitivity of Receptors	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

Source: (IAQM, 2024)

Risk Matrix of Dust Impacts – Trackout

Table 12-14: Risk Matrix of Dust Impacts - Trackout

Sensitivity of Receptors	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

Source: (IAQM, 2024)

Risk Matrix of Dust Impacts – Decommissioning

Table 12-15: Risk Matrix of Dust Impacts - Decommissioning

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

Source: (IAQM, 2024)

12.4.5 Overall Risk of Dust Impacts on Sensitive Receptors without Mitigation

Table 12-16 below shows the overall risk of dust impacts from the effects of dust soiling and PM_{10} on the sensitive receptors as a result of the Proposed Development. It uses the results of Table 12-4 and Table 12-11 and compares them against the risk matrices in section 12.4.4 (Table 12-12, Table 12-13, Table 12-14, and Table 12-15).

Table 12-16: Overall Risk of Dust Impacts on Sensitive Receptors without Mitigation

	Activity			
Potential Impact	**Construction**	**Earthworks**	**Trackout**	**Decommissioning**
Dust Soiling	Low Risk	Low Risk	Low Risk	Negligible Risk
Human Health	Low Risk	Low Risk	Low Risk	Negligible Risk
Ecological	Medium Risk	Medium Risk	Medium Risk	Negligible Risk

The results in Table 12-16 show that if left unmitigated the Proposed Development will have a medium risk of impacts upon ecological receptor Killarney National Park due to construction, earthworks and trackout activities.

Risks upon the human sensitive receptor Dwelling 1 is low risk from construction, earthworks and trackout activities from both dust soiling and human health (PM_{10}).

The results shown in Table 12-16 are assessed in further detail in section 12.6.2 below.

12.4.6 Additional Factors of Consideration

Cumulative Dust Impacts

There is no risk of cumulative impacts from dust generating activity occurring between the Proposed Development and other nearby developments (see Technical Appendix 2-3 for more information) as there are no other developments which share the same sensitive receptors as assessed in this dust assessment. As such, no developments have dust emitting activities located close enough to the sensitive receptors identified within this dust assessment to contribute cumulatively to the overall risk of dust soiling and PM_{10}.

Mitigating Factors

The Proposed Development is situated on existing forestry. The extensive existing forestry on site will provide screening of dust from sensitive receptors (IAQM, 2024).

The two largest dust emission activities (identified in table 12-4) of the Proposed Development - Earthworks and Trackout, are short term impacts occurring over the construction and decommissioning phases. The construction phase will last for 24 months, and similarly the decommissioning will last for a similar or shorter duration.

Trackout is most prevalent during the construction phase as this is when most of the vehicle movements occur (as is shown in Chapter 7: Traffic and Transport) and will be lesser during the decommissioning phase. Earthworks will only occur during the construction phase of the Proposed Development.

12.5 Carbon Savings and Losses from the Proposed Development

In order to assess the estimated release of greenhouse gases from construction and decommissioning of the Proposed Development against the avoided greenhouse gas emissions from displacing fossil fuel generation in Ireland's energy mix during the operational period, and therefore the Proposed Development's overall effect on climate, a methodology made available by the Scottish Government (2019) in tabular spreadsheet format titled '*Carbon Calculator Tool v1.7.0*' has been utilised.

Bogs and peatlands thrive under waterlogged conditions. Under such anaerobic conditions, organic material does not readily decompose, therefore, the carbon content of the material remains in-situ.

This is often referred to as a carbon sink. The drainage and excavation of undisturbed peat will lead to the drying out and therefore decomposition of organic material and release of greenhouse gases into the atmosphere.

Once the Proposed Development is operational, the electricity generated will displace electricity generation that would have otherwise been produced from fossil fuel sources. Resultingly this will also indirectly displace the associated greenhouse gas emissions from fossil fuel sources.

There will be some felling of forestry around turbine locations as a mitigation measure for the protection of bats. These trees may be felled earlier than originally planned as a result of the Proposed Development.

The carbon releases over the lifetime of the Proposed Development are calculated from the area to be felled and the average carbon that would have been sequestered annually. However, habitat enhancement will occur within some the felling buffers around the turbines (See Technical Appendix 8-4 Outline Habitat Management Plan).

The full range of theoretical carbon losses from the Proposed Development over its 35 year life span are presented in Table 12-17.

Table 12-17: Carbon Releases due to the Proposed Development

Source of Carbon Releases (tCO2 eq.)*	Scenario 1 (6MW)	Scenario 2 (7.2MW)
	CO2 Releases (tonnes CO2 equivalent)	
Releases due to turbine life (manufacture, construction, decommissioning)	92,609	111,670
Releases due to electricity generation backup (due to the intermittency of wind generation)	66,299	79,559
Releases due to reduced carbon fixing potential	4,114	4,114
Releases from soil organic matter	121,875	121,875
Releases due to dissolved organic carbon & particulate organic carbon leaching	0	0
Releases due to felling forestry	117,041	117,041

Source of Carbon Releases (tCO2 eq.)*	Scenario 1 (6MW)	Scenario 2 (7.2MW)
	CO2 Releases (tonnes CO2 equivalent)	
Total Releases	**401,938**	**434,259**

*tCO_2 eq. refers to tonnes of Carbon equivalent which is a metric measure to compare emissions from greenhouse gases on the basis of their global warming potential.

Scenario 1 has a carbon payback (equalisation) time of 6.2 years for an estimated 401,938 tonnes of CO_2 equivalent when compared against a common grid energy mix.

Scenario 2 has a carbon payback (equalisation) time of 5.6 years for an estimated 434,259 tonnes of CO_2 equivalent when compares against a common grid energy mix.

A mixed use grid contains both renewable and fossil fuel sources, as is found in Ireland at present (EirGrid, 2023).

In Scenario 1 the Proposed Development is in carbon payback for 17.7% of its operational lifespan. In Scenario 2 the Proposed Development is in carbon payback for 16% of its operational lifespan. Once carbon payback is reached, every tonne of carbon equivalent offset will be an overall carbon saving.

This is a long term positive effect and is consistent with the objectives of CAP23, reflecting a move away from fossil fuels in favour of renewable electricity generation. The Proposed Development will contribute to the fight against climate change.

Further details into the Carbon Calculations can be found in Technical Appendix 12-1 Carbon Calculator.

12.6 Assessment of Effects

12.6.1 Do-Nothing Scenario

If the Proposed Development was not to proceed, the opportunity to reduce emissions of Greenhouse Gases (GHGs) and air pollutants would be lost, due to the continued dependence on electricity derived from fossil-fuels. Rather than renewable energy sources such as the Proposed Development. This would result in an indirect, negative impact on air quality and climate.

12.6.2 Potential Impacts

Construction Phase

Air Quality

The dust assessment was completed using the screening criteria in the IAQM Guidance on the assessment of dust from demolition and construction (IAQM, 2024). The results of the overall risk of dust impacts upon sensitive receptors can be found in table 12-16 in Section 12.4.5 above.

Three dust emitting activities will occur during the construction phase of the Proposed Development. These are construction activities, earthworks, and dust emissions from construction phase associated trackout from vehicles.

The highest overall risk of impacts upon sensitive receptors from construction, earthworks and trackout activities has been assessed as medium risk. This risk is centred

on the ecological receptor Killarney National Park, with risk assessed as low on the human sensitive receptor, Dwelling 1.

Comparing the results of table 12-16 to the significance criteria in section 12.2.6. The construction phase of the Proposed Development in the absence of mitigation is likely to cause a **significant negative impact** over the duration of the construction phase on Killarney National Park due to construction, earthworks and trackout activities.

Climate

The quantities of greenhouse gas emissions produced during the construction phase of the Proposed Development will have a negligible impact on climate.

Operational Phase

Air Quality

As the Proposed Development will have been constructed there will be no large numbers of construction or delivery trips made by vehicles to the Proposed Development. Only occasional single 4x4 light vehicle visits will be made to the Proposed Development during the operational phase.

Trackout is the only dust emitting activity which could occur during the operational phase of the Proposed Development. The infrequency and small scale of these single vehicle visits would not significantly contribute to dust emissions.

In the unlikely event that a major component of a turbine needs to be replaced HGV(s) may be required to access the Proposed Development during the operational phase, however due to the short term, infrequency and low likelihood of such an event taking place, the operational phase will have a negligible impact.

Climate

The quantities of greenhouse gas emissions produced during the operational phase of the Proposed Development will have a negligible impact on climate.

As shown in section 12.5 the Proposed Development will have a **significant positive impact** on climate due to the carbon offsetting which will occur once carbon payback has been occurred.

Decommissioning Phase

Air Quality

Two dust emitting activities will occur during the decommissioning phase of the Proposed Development. These are decommissioning activities and dust emissions from decommissioning phase associated trackout.

The highest overall risk of impacts upon sensitive receptors from decommissioning has been assessed as medium risk. This risk is centred on the ecological receptor Killarney National Park, with risk assessed as low on the human sensitive receptor, Dwellings 1.

The highest overall risk of impacts upon sensitive receptors from trackout has been assessed as medium risk. This risk is centred on the ecological receptor Killarney National Park, with risk assessed as low on the human sensitive receptors.

However, dust emissions will be lower during the decommissioning phase than during the construction phase due to the limited nature of the works involved.

The decommissioning phase works are as follows:

- Removal of 17 No. wind turbines;
- Removal of permanent meteorological mast; and
- Removal of all associated underground electrical and communications cabling connecting the wind turbines to the wind farm substation.

All other elements of the Proposed Development will remain in-situ. Access Roads and associated drainage systems will serve ongoing forestry and agriculture activity in the area. All other hard surfaced areas will be allowed to revegetate naturally.

The numbers of vehicle trips to and from the Proposed Development will be less than the construction phase, and the associated trackout will therefore be less.

As such, the decommissioning phase in the absence of mitigation will have a **significant negative impact** on Killarney National Park.

Climate

The quantities of greenhouse gas emissions produced during the decommissioning phase of the Proposed Development will have a negligible impact on climate.

12.7 Mitigation Measures

Best practise will be adhered to during all phases of the Proposed Development in order to minimise dust generation. Outlined below are a series of mitigation measures and good working practises which will ensure that any potential impacts during all phases of the Proposed Development are minimised and to ensure there will be no adverse impact on the receiving environment.

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager;
- Display the head or regional office contact information;
- Record all dust and air quality complaints, identify causes, take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on or off site, and the action taken to resolve the situation in the log book;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barrier and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site keep them covered;
- Cover, seed or fence stockpiles to prevent wind whipping;
- Ensure all vehicles switch off engines when stationary – no idling vehicles;
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;

- Impose and signpost a maximum speed limit of 15mph and 10mph on unsurfaced access tracks and work areas;
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, for example suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the Proposed Development for effective dust/particulate matter suppression, using non-potable water where possible and appropriate;
- Use enclosed chutes, conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- Avoid bonfires and burning of waste materials;
- Allow re-vegetatation of earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoils, as soon as practicable;
- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately in order to prevent damage/leakage, and to prevent dust emission;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives whenever practicable;
- Use water-assisted dust sweepers(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving to site where reasonable practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits;

- Ensure effective water suppression is used during decommissioning operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground; and
- Bag and remove any biological debris or damp down such material before decommissioning.

12.8 Residual Effects for Air and Climate

Air Quality

After the implementation of the mitigation measures in section 12.7 there will be a **non-significant short-term negative impact** on Killarney national Park during the construction phase. There will be imperceptible impacts upon Dwelling 1.

Climate

The wind energy created by the Proposed Development will avoid the production of electricity from coal, oil or gas-fired power stations resulting in emission savings of carbon dioxide (CO2), nitrogen oxides (NOx), and sulphur dioxide (SO2). This will lead to an overall **significant long-term positive impact** on climate.

12.9 Assessment of Cumulative Effects

Air Quality

As previously mentioned in section 12.4.6, there is no risk of cumulative impacts from dust generating activity occurring between the Proposed Development and other nearby developments (see Technical Appendix 2-3 for more information) as there are no other developments which are located close enough to the sensitive receptors identified within this dust assessment to contribute cumulatively to the overall risk of dust soiling and PM_{10}. There will be a **negligible impact**.

Climate

The quantities of greenhouse gas emissions produced during the construction and decommissioning phases of the Proposed Development and all other developments considered in Technical Appendix 2-3 will have a **negligible cumulative impact** on climate.

The cumulative positive impacts of the Proposed Development and all other cumulative windfarms considered in Technical Appendix 2-3 will result in a **significant positive cumulative impact** on climate.

12.10 Summary and Statement of Significance

Taking account of the mitigation measures proposed, no potentially significant negative impacts are anticipated.

12.11 References

Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016. Available: https://www.irishstatutebook.ie/eli/2016/si/659/made/en/print

Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. Available: http://data.europa.eu/eli/dir/2004/107/oj

Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air and cleaner air for Europe. Available: http://data.europa.eu/eli/dir/2008/50/2015-09-18

Directive 2015/1480 of 28 August 2015 amending several annexes to Directives 2004/107/EC and 2008/50/EC of the European Parliament and of the Council laying down the rules concerning reference methods, data validation and location of sampling points for the assessment of ambient air quality. Available: http://data.europa.eu/eli/dir/2015/1480/oj

EirGrid, 2023. System Information. Available: https://www.eirgridgroup.com/how-the-grid-works/system-information/ [Accessed 20/11/2023]

Environmental Protection Agency (EPA), 2022. Air Quality in Ireland 2021. Available: https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2021.php [Accessed: 07/09/2023]

Environmental Protection Agency (EPA), 2023a. Air Quality Bulletin 2023. Available: https://airquality.ie/information/air-quality-bulletins [Accessed: 07/09/2023]

Environmental Protection Agency (EPA), 2023b. Readings. Available: https://airquality.ie/readings [Accessed: 08/09/2023]

European Environment Agency (EEA), 2019. 2.A.5.b Construction and demolition 2019. Available: https://www.eea.europa.eu/publications/emep-eea-guidebook-2019/part-b-sectoral-guidance-chapters/2-industrial-processes/2-a-mineral-products/2-a-5-b-construction/view [Accessed: 07/11/2023]

European Environment Agency (EEA), 2023. European Air Quality Index. Available: https://airindex.eea.europa.eu/Map/AQI/Viewer/ [Accessed 08/09/2023]

Government of Ireland, 2022. Climate Action Plan 2023. Available: https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/ [Accessed: 25/01/2023]

Government of Ireland, 2023. Clean Air Strategy for Ireland. Available: https://www.gov.ie/en/publication/927e0-clean-air-strategy/ [Accessed: 08/09/2023]

Institute of Air Quality Management (IAQM), 2014. Guidance on the assessment of dust from demolition and construction – February 2014, amended 2016 (Version 1.1). Available: https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf [Accessed 24/01/2024]

Institute of Air Quality Management (IAQM), 2024. Guidance on the assessment of dust from demolition and construction – January 2024 (Version 2.2). Available: https://iaqm.co.uk/guidance/ [Accessed: 23/05/2024]

Irish Statute Book (ISB), 2011. S.I. No. 180/2011 – Air Quality Standards Regulations 2011. Available: https://www.irishstatutebook.ie/eli/2011/si/180/made/en/print [Accessed: 17/01/2023]

Irish Statute Book (ISB), 2022. S.I. No. 739/2022 – Air Quality Standards Regulations 2022. Available: https://www.irishstatutebook.ie/eli/2022/si/739/made/en/ [Accessed 21/05/2024]

Joint Nature Conservation Committee (JNCC), 2005. The Vascular Plant Red Data List for Great Britain. Available: https://hub.jncc.gov.uk/assets/cc1e96f8-b105-4dd0-bd87-4a4f60449907 [Accessed: 09/11/2023]

Met Éireann (2023). Monthly Data – Cork Airport. Available: https://www.met.ie/climate/available-data/monthly-data [Accessed: 03/10/2023]

National Parks & Wildlife Service (NPWS), 1988. The Irish Red Data Book – 1 Vascular Plants. Available: https://www.npws.ie/publications/red-lists [Accessed: 16/11/2023]

Transport Infrastructure Ireland (TII), 2022a. PE-ENV-01106 – Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document. Available: https://www.tiipublications.ie/advanced-search/results/document/?id=3217 [Accessed: 07/11/2023]

Transport Infrastructure Ireland (TII), 2022b. PE-ENV-01107 – Air Quality Assessment of Proposed National Roads – Standard. Available: https://www.tiipublications.ie/document/?id=3218 [Accessed: 07/11/2023]

World Health Organization (WHO), 2021. WHO global air quality guidelines: particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Available: https://www.who.int/publications/i/item/9789240034228 [Accessed: 07/09/2023]

World Meteorological Organization (WMO), 2023. State of the Global Climate 2022. Available: https://library.wmo.int/records/item/66214-state-of-the-global-climate-2022 [Accessed: 29/09/2023]