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.

10.1.1 Background

For the purposes of this EIAR:

- The '**Proposed Wind Farm'** refers to the 8 no. turbines and supporting infrastructure which is the subject of this Section 37E application;
- The '**Proposed Grid Connection'** refers to the 110kV substation and supporting infrastructure which will be the subject of a separate Section 182A application;
- The '**Proposed Project'** comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Site Boundary (the 'Site') and assessed together within this EIAR.

The Proposed Project is located within a rural setting in northwest Galway approximately 8km southwest of Tuam and 10km north of Claregalway, Co. Galway. It is proposed to access the Proposed Wind Farm site via a temporary road off the N83 National Road Galway to Tuam Road. Construction traffic will exit the Site via the L61461 Local Road. The Proposed Wind Farm is served by a number of existing agricultural roads and tracks. It is intended to connect the Proposed Wind Farm to the national grid via a 110kV underground grid connection from the proposed onsite 110kV substation and the existing Cloon 110kV electrical substation in the townland of Cloonascragh, Co. Galway. The Proposed Grid Connection underground cabling will be approximately 14.3km in length and will be primarily located within the public road network.

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.

Due to the non-industrial nature of the Proposed Project, and the general character of the surrounding environment, baseline air quality sampling was deemed to be unnecessary for this EIAR. It is expected that the air quality in the existing environment is good, since there are no major sources of air pollution (e.g. heavy industry) in the vicinity of the Site.

The production of energy from wind turbines has no direct air emissions as is expected from fossil fuel-based power stations. Harnessing more energy by means of renewable sources will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some temporary or short-term indirect emissions associated with the construction of the Proposed Project will include vehicular and dust emissions.

10.1.2 Statement of Authority

This section of the EIAR has been prepared by Niamh McHugh, and reviewed by Órla Murphy and Sean Creedon, all of MKO. Niamh is an Environmental Scientist who has been working with MKO since June 2021. Niamh possesses a BSc (Hons) in Environmental Science from the National University of Ireland, Galway. Niamh has been involved in the compilation and production of a number of EIARs, mainly in the field of Renewables. The chapter has been reviewed by Órla Murphy and Sean

Creedon of MKO. Órla is a Senior Environmental Scientist with nearly 8 years' experience in the environmental sector where she has acted as Project Manager for a number of EIAR applications for wind energy developments, compiling numerous EIAR chapters including chapters on Population and Human Health. Órla holds a BSc. in Geography and MSc. in Environmental Protection and Management. Sean is an Associate Director in the Environment Team and has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of wind farm project delivery.

10.1.3 Relevant Guidance and Legislation

The air quality section of this EIAR is carried out in accordance with the 'EIA Directive' as mended by Directive 2014/52/EU and having regard, where relevant, to guidance listed below.

- Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107' (Transport Infrastructure Ireland, December 2022).
- 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)
- Environmental Protection Agency (2023) Air Quality in Ireland Report 2022.
- Environmental Protection Agency (2021) Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects.
- Environmental Protection Agency
- Guidance on the Assessment of Dust from Demolition and Construction V1.1 (IAQM 2016);
- 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);
- Rialtas na Éireann Clean Air Strategy for Ireland (April 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 Sulfur Dioxide Global Update 2005 (WHO 2005).

10.2 Air Quality

10.2.1 Air Quality Standards

In 1996, the Air Quality Framework Directive (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. 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, published in 2007, 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 (SI No 58 of 2009).

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFÉ) Directive (Directive 2008/50/EC) on ambient air quality) (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 for time extensions of three years (for particulate matter PM10) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 10-1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre (µg/m^3) and parts per billion (ppb). The notation PM10 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 (SI 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 (SI No 659 2016). These Regulations supersede the Air Quality Standards Regulations 2002 (SI No 271 of 2002), the Ozone in Ambient Air Regulations 2004 (SI No 53 of 2004) and the Ambient Air Quality Assessment and Management Regulations 1999 (SI No. 33 of 1999)

Table 10-1 Limit Values of Directive 2008/50/EC and 2000/69/EC (Source: https://www.epa.ie/air/quality/standards/)

Pollutant	Limit Value Objective	Averaging Period	Limit Value (ug/m^3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO2)	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 (SO2)	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)	Upper assessment	24 hours	75	28	Not to be exceeded more	1st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value (ug/m^3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
	threshold for the protection of human health				than 3 times in a calendar year	
Sulphur dioxide (SO_2)	Lower assessment threshold for the protection of human health	24 hours	50	19	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen dioxide (NO_2)	Upper assessment threshold for the protection of human health	1 hour	140	73	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Lower assessment threshold for the protection of human health	1 hour	100	52	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM10)	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005
Particulate matter 2.5 (PM2.5)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value (ug/m^3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Particulate matter 2.5 (PM2.5) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 10 (PM_{10})	Upper assessment threshold for the protection of human health	24 hours	30	-	Not to be exceeded more than 7 times in a calendar year	Based on the indicative limit values for 1 January 2010
Particulate matter 10 (PM_{10})	Lower assessment threshold for the protection of human health	24 hours	20	-	Not to be exceeded more than 7 times in a calendar year	Based on the indicative limit values for 1 January 2010
Particulate matter 2.5 (PM2.5) 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

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 10-2 presents the limit values and target values for ozone.

Table 10-2 Target Values for Ozone Defined in Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8-hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT40* calculated from 1-hour values from May to July	18,000 $mg/m^3.h$ averaged over 5 years	6,000 $mg/m^3.h$
Information Threshold	1-hour average	180 mg/m^3	-
Alert Threshold	1-hour average	240 mg/m^3	-

*OT40 is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentration greater than 80 g/m^3 and is expressed as g/m^3 hours.

On the 26th of October 2022 the EU Commission announced a proposed review of Air Quality Standards. 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. To this end, regular reviews of the air quality standards are proposed to reassess them in line with latest scientific evidence as well as societal and technological developments. The first review is proposed to take place by the end of 2028, with the objective of ensuring full alignment with WHO recommendations.[1]

10.2.1.1 Air Quality and Health

The World Health Organisation (WHO) in 2016 estimated that ambient air pollution caused 4.2 million deaths worldwide in 2016 (WHO, 2018). In September 2023, the Environmental Protection Agency (EPA) published 'Air Quality in Ireland 2022'[2] which reports that although air quality in Ireland is generally good, there are concerning localised issues. Fine particulate matter (PM2.5) from solid fuel combustion and nitrogen dioxide (NO2) from vehicle emissions are the main pollutants. People's health and the health of our environment is impacted by these pollutants. Ireland's ambition in the 'Clean Air Strategy for Ireland' (discussed below) is to move towards the World Health Organisation (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 Report' highlights the negative effects of air pollution on human health across the EU. The report assessed that poor air quality accounted for premature deaths of approximately 238,000 people in the 27 EU Member States in 2021 and 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 Organization. Furthermore, in 2020, damaging levels of nitrogen deposition to ecosystems were exceeded in 75% of the total ecosystem area in the EU-27. This represents a fall of 12% since 2005.

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. A 2016 EPA report 'Ireland's Environment – An Assessment' states that the pollutants of most concern are NOx, (the collective term for the gases nitric oxide and nitrogen dioxide, PM (particulate matter) and O3 (ozone). The EPA report goes on to state that:

> "*Ireland has considerable renewable energy resources, only a fraction of which are utilised to address our energy requirements*".

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

10.2.1.1.1 *Ireland's Environment – an Assessment 2016*

The EPA 2016 report '*Ireland's Environment – An Assessment'* states that the pollutants of most concern are NOx (the collective term for the gases nitric oxide and nitrogen dioxide, PM (particulate matter) and O_3 (ozone). The EPA 2016 report goes on to state that:

> *'Ireland has considerable renewable energy resources, only a fraction of which are utilised to address our energy requirements.*

[1] *https://environment.ec.europa.eu/topics/air/air-quality/revision-ambient-air-quality-directives_en*
[2] *Environmental Protection Agency: Air Quality in Ireland 2022. Available at: https://www.epa.ie/publications/monitoring–assessment/air/Air_Quality_Report_22_v8-flat.pdf*

Wind, ocean, solar, hydro and geothermal energy do not produce GHG emissions or emissions of air pollutants such as particulates, sulphur dioxide, and nitrogen dioxisw. Use of these renewable resources can have considerable co-benefits for human health and ecosystems. Meeting energy requirements from renewable resources can provide significant economic and employment benefits at local to national scales.'

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 particles, sulphur dioxide and nitrogen dioxide to our 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), and sulphur dioxide (SO2), thereby resulting in cleaner air and associated positive health effects.

10.2.1.1.2 Clean Air Strategy for Ireland 2023

Ireland's Clean Air Strategy 2023 sets out the detail of seven strategic frameworks that will be used to ensure that air quality continues to improve. 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 to deliver health benefits for all;
- To ensure integration of clean air considerations into policy development across Government;
- To increase the evidence base that will help us to continue to evolve our understanding of the sources of pollution and their impacts on health, in order to address them more efficiently;
- To enhance regulation required to deliver improvements across all pollutants;
- To improve the effectiveness of our enforcement systems
- To promote an 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.

Figure 10-1 Seven Strategic Framework 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 States 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 2023, as well as to protecting against security of supply risks and removal of fossil fuels from power generation. Wind (offshore and onshore) and solar energy will be the leading cost-effective technologies to achieve our energy and emissions targets, as well as displacing emissions in other sectors, including household heating and vehicle transport.

10.2.2 Methodology

The air quality zone for the Site was selected, followed by a review of EPA collated baseline air quality data namely Sulphur Dioxide (SO_2), Particulate Matter (PM_{10}), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO) and Ozone (O_3) for the selected air quality zone to determine the representative levels of such emissions for the Proposed Project.

10.2.3 Air Quality Zones

The EPA has designated four Air Quality Zones for Ireland:

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

These zones were defined to meet the criteria for air quality monitoring, assessment and management as described in the CAFE Directive, Framework Directive and Daughter Directives. The Site of the Proposed Project lies within Zone D, which represents rural areas located away from large population centres.

10.2.3.1 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 2022' was published by the EPA in 2023[3]. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D. These are detailed in the Baseline Air Quality section.

10.2.3.2 Dust

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (2014) was considered in the dust impact assessment. The guidance document outlines an assessment method for predicting the effect of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust effects. 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 the UK 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 guidance (2014) to reflect their different potential effects. These are:

[3] *Environmental Protection Agency: Air Quality in Ireland 2022. Available at : https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland 2022.php#:~:text=In%202022%20air%20monitoring%20results,threats%20to%20good%20air%20quality.*

- Demolition (there are no demolition works required for any phase of the Proposed Project);
- Earthworks;
- Construction;
- Trackout

The transport of dust and dirt from the construction/demolition site onto the public road is known as trackout. If trackout occurs, it allows dust and dirt particles to be deposited and then re-suspended by vehicles using the network. This arises when Heavy Goods Vehicles (HGVs) leave the construction/ demolition site with dusty materials, which may then spill onto the road, and/or when HGVs transfer dust and dirt onto the road having travelled over muddy ground onsite.

The magnitude of dust generating activities is divided into 'Large', 'Medium', or 'Small' scale depending on the nature of the activities involved.

For earthworks, the following classifications apply:

- Large: Total site area >10,000 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 >8 m in height, total material moved >100,000 tonnes;
- Medium: Total site area 2,500 m^2– 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes; and
- Small: Total site area <2 ,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.

For Construction, the following classifications apply:

- Large: Total building volume >100, 000 m3, on site concrete batching, sandblasting;
- Medium: Total building volume 25,000 m3 – 100,000 m3, potentially dusty construction material (e.g. concrete), on site concrete batching; and,
- Small: Total building volume <25,000 m3, construction material with low potential for dust release (e.g. metal cladding or timber).

For Trackout, the following classifications apply:

- Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- Medium: 10-50 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; and
- Small: <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

The earthwork requirements as outlined in Appendix 4-5 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 'Small' for Construction due to the lower volumes of construction material required. The number of heavy-duty vehicle 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.

10.2.3.2.1 Defining the Sensitivity of the Area

For the purpose of this assessment, high sensitivity receptors are regarded as those properties where people are likely to spend most of their time and are referred to as 'sensitive receptors'. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods of time or do not expect a high level of amenity.

The IAQM (2014) guidance has outlined three types of effects to be considered:

- Sensitivities of People to Dust Soiling Effects
- Sensitivities of People to Health Effects of PM10
- Sensitivities of Receptors to Ecological Effects.

Sensitivities of People to Dust Soiling Effects

Dust soiling effects can occur for a distance of 350m from the works areas, but the majority of deposition occurs within the first 50m (IAQM, 2014). Table 10-3 below identifies the sensitivity of an area to soiling effects on people and their properties, relative to different receptor sensitivities.

Table 10-3 Sensitivity of the Area to Dust Soiling Effects on People and Property. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
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 PM10

When assessing sensitivity of people to the health effects of PM10, the IAQM (2014) guidance recommends the use of sensitivities bands based on whether or not the receptor is likely to be exposed to elevated concentrations of PM10 over a 24-hour period. Table 10-4 below identifies the sensitivity of an area to human health effects of PM10, relative to different receptor sensitivities.

Table 10-4 Sensitivity of the Area to Human Health Impacts. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<350
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

Sensitivities of Receptors to Ecological Effects

Dust deposition due to demolition, earthworks, construction and trackout has the potential to physically and chemically affect sensitive habitats and plant communities. Table 10-5 below identifies the sensitivity bands to be used when assessing ecological impacts from dust deposition.

Table 10-5 Sensitivity of the Area to Ecological Impacts. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

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

There are no sensitive habitats, as described within the IAWM guidance within 50m of the Proposed Wind Farm infrastructure. Therefore, dust impacts on ecological receptors in relation to the Proposed Wind Farm have been scoped out from this assessment.

The Proposed Grid Connection underground cabling route crosses the River Clare, part of the Lough Corrib SAC along the N83 National Road. These receptors are assessed below in Section 10.3.2.

10.2.3.2.2 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 matrices in Table 10-6, Table 10-7 and Table 10-8 provide a method of assigning the level of risk for each activity.

Table 10-6 Risk of Dust Impacts - Earthworks (IAQM, 2014)

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

Table 10-7 Risk of Dust Impacts - Construction

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

Table 10-8 Risk of Dust Impacts - Trackout

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

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

10.2.4 Baseline Air Quality

The air quality in the vicinity of the Proposed Project is typical of that of rural areas 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 2022' was

published by the EPA in 2023. 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)

The Sulphur dioxide data from Cork Harbour, Kilkitt, Askeaton, Edenderry and Letterkenny in 2022 is presented in Table 10-7

Table 10-7 Average Sulphur Dioxide Data for Zone D in 2022

Parameter	Measurement (ug/m³)
Annual Mean	5.0
Hourly values > 350	0.0
Hourly max	83.6
Daily values > 125	0
Daily max	22.8

During the monitoring period there were no exceedances of the daily limit values of the protection of human health. As can be observed from Table 10-3, the average maximum hourly value recorded during their assessment period was 83.6 µg/m^3. In addition, there were no exceedances of the usual annual mean limit for the protection of ecosystems. It would be expected that SO_2 values at the Site would be 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, soil and road surfaces, construction works and industrial emissions. The EPA report provides annual mean PM_{10} concentration for sixteen Zone D towns; Tipperary town, Carrick-on-Shannon, Enniscorthy, Birr, Askeaton, Macroom, Castlebar, Cobh Carrignafoy, Claremorris, Kilkitt, Cavan, Edenderry, Mallow, Longford, Cobh Cork Harbour, Killarney and Roscommon town. Particulate matter (PM_{10}) data for 2022 is presented in Table 10-8.

Table 10-8 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2022

Parameter	Measurement (ug/m3)
Annual Mean	12.7
% Data Capture	93.2
Values > 50 ug/m3	Max 10
Daily Max	56.5

The daily limit of 50 µg/m3 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/m3 applicable from 2005. It would be expected that PM_1 values at the Site would be similar to or lower than those recorded for the Zone D sites above. The greatest number of exceedances occurred at Edenderry where the PM10 daily limit was exceeded on 10 occasions. In the EPA 2022 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."

10.2.4.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide data for Birr, Castlebar, Carrick-on-Shannon, Edenderry, Emo Court and Kilkitt in 2022 is presented in Table 10-9.

Table 10-9 Average Nitrogen Dioxide Data for Zone D Sites in 2022

Parameter	Measurement
Annual Mean	7.4
NO2 Values >200	0
Values > 140 (UAT)	1
Values >100 (LAT)	4
Hourly Max.	87.3

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 and upper assessment thresholds of 100 and 140 µg/m^3 were exceeded a total of 5 times across all stations during the monitoring period. The average hourly max. NO_2 value of 87.3 µg/m^3 measured during the monitoring period was below the hourly max threshold of 200 µg/m^3. It would be expected that NO_2 values at the Site would be similar or lower than those recorded for the Zone D sites above.

10.2.4.4 Carbon Monoxide (CO)

The EPA Report provides rolling 8-hour carbon monoxide concentrations for Birr, a Zone D site. Carbon Monoxide data for 2021 is presented in Table 10-6. Carbon Monoxide data for 2020 is presented in Table 10-10.

Table 10-10 Carbon Monoxide Data for Birr – Zone D Site in 2022.

Parameter	Measurement
Annual Mean	0.8 mg/m3
Median	0.7 mg/m3
% Data Capture	95.9%
Values > 10	0
Max	3.4 mg/m3

The average concentration of carbon monoxide was 0.8 mg/m^3. The carbon monoxide limit value for the protection of human health is 10,000 µg/m^3 (or 10mg/m^3). On no occasions were values in excess of the 10 mg limit value set out in Directives 2000/69/EC or 2008/69/EC.

10.2.4.5 Ozone (O_3)

The EPA report provide rolling 8-hour ozone concentrations for seven Zone D sites, Emo Court, Kilkitt, Carnsore Point, Mace Head, Castlebar, Valentia and Malin Head. Ozone (O_3) data for 2022 is presented in Table 10-11. As can be observed there were no exceedances of the maximum daily eight-hour mean limit of 120 µg/m^3. The legislation stipulates that this limit should not be exceeded on more than 25 days.

Table 10-11 Average Ozone Data for Zone D Sites in 2022.

Parameter	Measurement
Annual Mean	61.7µg/m3
Median	62.2 µg/m3
% Data Capture	89.5%
No. of days > 120	17 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/m²/day. The EPA recommends a maximum daily deposition level of 350 mg/m²/day when measured according to the TA Luft Standard 2002. This limit value can also be implemented with regard to dust impacts from construction activities associated with the Proposed Project.

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

The potential dust-related effects on local air quality and the relevant associated mitigation measures are presented in Sections 10.2.4 below.

10.3 Likely and Significant Impacts and Associated Mitigation Measures

10.3.1 'Do-Nothing' Effect

If the Proposed Project were not to proceed, the opportunity to reduce emissions of carbon dioxide, oxides of nitrogen (NO_x), and sulphur dioxide (SO_2) to the atmosphere would be lost due to the continued dependence on electricity derived from coal, oil and gas-fired power stations, rather than renewable energy sources such as the Proposed Wind Farm. This would result in an indirect, slight, negative impact on air quality nationally.

10.3.2 Construction Phase

10.3.2.1 Exhaust Emissions: Construction of Proposed Project Infrastructure

Identification of Effect

Proposed Wind Farm

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

The construction of turbines and associated foundations and hardstanding areas, meteorological mast, access roads, temporary construction compound, underground cabling, site drainage, hedgerow felling, and all ancillary works and apparatus, will require the operation of construction vehicles and plant on and off-site, and the transport of workers to and from the Site. Therefore, this is considered a short-term slight, negative impact on air quality.

The construction of the spoil management areas will require the use of construction machinery and plant, there by giving rise to exhaust emissions. Therefore, this is considered a short-term slight, negative impact on air quality.

Proposed Grid Connection

The construction of the proposed onsite 110kV substation and temporary construction compound, and the underground cabling route connecting the on-site 110kV substation to the existing Cloon 110kV substation in the townland of Cloonascragh, Co. Galway, will require the use of construction machinery, thereby giving rise to exhaust emissions as already outlined for the Proposed Wind Farm activities. This is a short-term, slight, negative impact, which will be reduced through use of the best practice mitigation measures as presented below.

Mitigation & Monitoring Measures for the Proposed Project

- Proposed Project Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.
- All plant and materials vehicles shall be stored in dedicated areas (on-site). Machinery will be switched off when not in use.

- Turbines and construction materials will be transported to the Site on specified routes only, unless otherwise agreed with the Planning Authority. Please see Chapter 15 Material Assets for details.
- Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions.
- Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
- 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 MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5).

Residual Effect

With the implementation of the above measures for this phase construction phase, residual impacts on air quality from exhaust emissions associated with construction activities and machinery are considered to be a short-term imperceptible negative impact.

Significance of Effects

The effects on air quality from exhaust emissions during the construction phase of the Proposed Project are considered to be imperceptible.

10.3.2.2 Exhaust Emissions: Transportation to and from the Site

Identification of Effect

Proposed Wind Farm

The transport of turbine components, supporting infrastructure materials, construction and staff vehicles, small volume of aggregate material, and waste removal vehicles to/from the Site (see in Chapter 4 Description of this EIAR), the departure of empty vehicles and/or minor waste volumes (please see accompanying CEMP Appendix 4-5) from the Site and daily staff movements, will give rise to exhaust emissions associated with the transport vehicles.

Proposed Grid Connection

The transport of substation infrastructure, construction vehicles, aggregate material, waste removal vehicles and construction staff to/from the Site for the construction of the Proposed Grid Connection (Chapter 4 Description of this EIAR), the departure of empty vehicles and/or minor waste volumes (please see accompanying CEMP Appendix 4-5) from the Site and daily staff movements, will give rise to exhaust emissions associated with the transport vehicles.

Mitigation & Monitoring Measures for the Proposed Project

- Measures listed in section 10.3.2.1 above pertaining to exhaust emissions will be implemented for the transportation of vehicles to and from the Site.

- Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions.
- Turbines and construction materials will be transported to the Site on specified haul routes only.
- 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 amount of emissions associated with vehicle movements.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5).

Residual Effect

This constitutes a short-term slight negative impact on air quality brought about by the exhaust emissions associated with the traffic movements to and from the Site.

Significance of Effects

Based on this assessment there will be a slight significant effect on air quality from exhaust emissions due to traffic movements to and from the Site.

10.3.2.3 Dust Emissions: Construction of Proposed Project Infrastructure

Identification of Effect

Proposed Wind Farm

The construction of turbines and associated foundations and hard-standing areas, Meteorological Mast, Access Roads, Temporary Construction Compound, Underground Internal Cabling, Site Drainage, Hedgerow Felling, and all ancillary works and apparatus will give rise to dust emissions.

All construction materials for the Proposed Wind Farm will be imported to the Site from local quarry facilities.

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

This is considered a short-term, slight, negative impact on air quality.

Proposed Grid Connection

The construction of the Proposed Grid Connection (permanent 110kV substation, temporary construction compound, underground grid connection cabling) will give rise to dust emissions. It is proposed to provide construction grade materials (approx. 17,700m^3) for the Proposed Grid Connection infrastructure from local licenced quarries. Please see Figure 4-24 for locations.

The IAQM methodology for *the Assessment of Dust from Demolition and Construction* as discussed in section 10.2.3.2 is used to predict the likely risk of dust impacts as a result of the construction works. Dust deposition impacts can occur for a distance of 350m from works areas, but the majority of deposition occurs within the first 50m (IAQM, 2014). As discussed in Section 10.2.3.2.1, the above

sensitive receptors were derived from the constraints identification and mapping process, detailed and updated planning search which informed the project sensitive property dataset.

- There is 1 no. sensitive receptor located approx. 15m of the Proposed Wind Farm footprint (upgrade to existing road).;
- There are 5 no. sensitive receptors within 50m of the Proposed Wind Farm footprint (upgrades to existing roads);
- There are 7 no. sensitive receptors within 100m of the Proposed Wind Farm footprint (upgrades to existing roads);
- There are 22 no. sensitive receptors within 350m of the Proposed Wind Farm footprint (upgrades to existing roads); where construction activities with the potential to generate dust can occur.

As per the criteria in Table 10-10 below, the overall sensitivity of the area to dust soiling impacts is **Low**. For the construction phase, the impact is considered to be a short term, slight negative impact.

Table 10-12 Sensitivity of the Area to Dust Soiling Effects on People and Property. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
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

Mitigation & Monitoring Measures for the Proposed Project

- 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 to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.
- All plant and materials vehicles shall be stored in dedicated areas within the Site.
- Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
- Turbines and construction traffic will be transported to the Site on specified haul routes only.
- The agreed haul route road adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary.
- The roads adjacent to the Site entrance will be checked weekly or damage/potholes and repaired as necessary.
- The transportation of construction materials from locally sourced quarries to the Site will be covered by tarpaulin where necessary.
- If necessary, excavated material will be dampened prior to transport to the spoil management areas.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5). The CEMP includes dust suppression measures.

Residual Impact

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

Significance of Effects

The effects on air quality from dust emissions during the construction phase will be imperceptible.

10.3.2.4 Dust Emissions: Transport to and from the Site

Identification of Effects

Proposed Wind Farm

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

All aggregate materials needed for the Proposed Wind Farm will be imported into the Site from local quarry facilities. This has the potential for effects arising related to dust.

Proposed Grid Connection

The transport of substation infrastructure, construction vehicles, aggregate material, waste removal vehicles and construction staff to/from the Site for the construction of the Proposed Grid Connection will also give rise to some localised dust emissions during periods of dry weather.

The Institute of Air Quality Management Construction Dust Guidance (IAQM 2014) states that the track out (the spreading of dust onto roads from the wheels of vehicles leaving construction sites) 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.

The construction phase timeframe for the Proposed Project is 18–24 months which equates to a max. total of 510 working days. The total additional HGV numbers generated on public roads during the construction phase will be greater than 50+ HGVs per day. Please see Chapter 15 Material Assets for details on traffic volumes. Based on the methodology detailed in Section 10.2.3.2.1, this is considered a large level of dust emissions from trackout. Combined with the established sensitivity of the area of as **Low** (Table 10-10, Table 10-11, Table 10-12 and Table 10-13 above), the dust emission magnitude for the transportation of materials to and from Site is **Low** which is assessed as a short-term slight negative impact. Mitigation measures to reduce the significance of this effect are presented in Table 10-13 below.

Table 10-13 Risk of Dust Impacts from Trackout. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

Sensitivity of Area	**Dust Emission Magnitude**		
	Large (50+ HGVs)	Medium (10-50 HGVs)	Small (less than 10HGVs)
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible Risk

Mitigation & Monitoring Measures for the Proposed Project

- 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 to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.
- All plant and materials vehicles shall be stored in dedicated areas within the Site.
- Turbines and construction vehicles will be transported to the Site on specified haul routes only.
- Proposed Grid Connection infrastructure will be transported to the Site on specified haul routes only.
- Construction materials for the Proposed Grid Connection and a small volume for the Proposed Wind Farm will be sourced locally from licenced quarries.
- The agreed haul route roads adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary.
- The roads adjacent to the Site entrance will be checked weekly for damage/potholes and repaired as necessary.
- The transport of construction materials around the Site from the nearby quarry facilities will be covered by tarpaulin where necessary.
- 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 amount of emissions associated with vehicle movements
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5).

Residual Effect

Following implementation of mitigation measures as outlined above, residual effects on air quality from dust emissions from traffic movements to and from the Site during the construction phase will have a short-term imperceptible negative effect.

Significance of Effects

Based on the assessment above the effects on air quality from dust emissions generated by traffic movements to and from the Site during the construction phase will be imperceptible.

10.3.3 Operational Phase

10.3.3.1 Exhaust Emissions: Proposed Project

Identification of Effect - Proposed Wind Farm

The operational phase of the Proposed Wind Farm will generate additional traffic to the area in the form of light goods vehicles (LGVs) visiting the site 1-2 times per day for inspections but on occasion, daily visits by LGVs and HGVs may be required over short periods during maintenance/component replacement activities. The addition of a LGV to the area 1-2 times per day during the operational phase will give rise to a long-term imperceptible negative effect on air quality. The addition of several HGVs on occasion over the 30-year lifetime of the Proposed Wind Farm will give rise to a long-term imperceptible negative effect on air quality due to exhaust emissions.

Identification of Effect - Proposed Grid Connection

The onsite 110kV substation will be operated and maintained by Eirgrid. It is anticipated that substation operators will visit the Site 1-2 times per day in LGVs but on occasion, HGVs maybe 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 type during the operational phase will give rise to a long-term imperceptible negative impact on air quality. The addition of several HGVs on occasion over the 30-year lifetime of the Proposed Grid Connection will give rise to a long-term imperceptible negative impact on air quality.

Mitigation & Monitoring Measures for the Proposed Project

- 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.

Residual Effect

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

Significance of Effects

Based on this assessment above the effects on air quality from exhaust emissions generated at the Site during the operational phase will be imperceptible.

10.3.3.2 Dust Emissions: Proposed Project

Identification of Impact - Proposed Wind Farm

As discussed above in Section 10.3.3.1, the operational phase of the Proposed Wind Farm will generate additional traffic to the area in the form of LGVs 1-2 visits per day and on occasion, daily LGVs and

HGVs for short periods if maintenance or component replacement is required. This additional traffic may give rise to dust emissions. This will be a long-term imperceptible negative impact on air quality due to dust emissions.

Identification of Impact - Proposed Grid Connection

As discussed above in Section 10.3.3.1, the onsite 110kV substation will be operated and maintained by EirGrid who may be required to visit the Site 1-2 times per day. On occasion, HGVs may be required to visit the Site for maintenance/substation component replacement. 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.

Mitigation & Monitoring Measures for the Proposed Project

- Maintenance vehicles brought onsite during the operational phase will be maintained in good operational order, thereby minimising any dust emissions that arise.
- Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.

Residual Impact

Based on the above, the impact on air quality from dust emissions during the operational phase is a Long-term Imperceptible Negative Impact.

Significance of Effects

Based on this assessment above the effects on air quality from dust emissions generated at the Site during the operational phase will be imperceptible

10.3.3.3 Air Quality

Identification of Impact - Proposed Project

Although a long term negative imperceptible impact on air quality is expected during the operational phase due to exhaust and dust emissions from maintenance vehicles, there will be no net carbon dioxide (CO_2) emissions from operation of the Proposed Project. By providing an alternative to electricity derived from coal, oil or gas-fired power stations, the Proposed Project will result in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2). The production of renewable energy from the Proposed Project will have a long-term significant positive impact on air quality due to the offsetting of approximately 50,822 tonnes of Carbon Dioxide (CO_2) per annum. Please see Chapter 11 Climate for further details on carbon displacement calculations.

Residual Impact

The overall impact will be a Long-term Moderate Positive Impact on air quality due to the offsetting of approximately 50,822 tonnes of Carbon Dioxide (CO_2) per annum (see Chapter 11 for details), due to the provision of renewable energy in the range of approximately 40880 Irish households with electricity per year.

Significance of Effects

Based on the assessment above there will be long-term, moderate, positive effect on air quality.

10.3.3.3.2 *Human Health*

Exposure to chemicals such as SO_2 and NO_x are known to be harmful to human health. The production of clean renewable energy from the Proposed Project will offset the emission of these harmful chemicals by fossil fuel-powered sources of electricity and, therefore, will have a long term slight 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.

Residual Impact

Long-term Slight Positive Impact.

Significance of Effects

Based on the assessment above there will be a significant positive effect on human health due to the operation of the Proposed Project.

10.3.4 Decommissioning Phase

The Proposed Wind Farm is seeking permission for an operational life of 30 years. Wind turbines are expected to have a lifespan of approximately 30-35 years. Following the end of their life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Wind Farm may be decommissioned fully. The Proposed Grid Connection onsite 110kV substation and underground cabling will remain in place as it will be under the ownership of EirGrid.

A Decommissioning Plan is included as Appendix 4-7 of this EIAR for the decommissioning of the Proposed Project, the detail of which will be agreed with the local authority prior to any decommissioning. Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less effect. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential effects. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed within this EIAR.

10.4 Cumulative Effects

The potential for impact between the Proposed Project, and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Project (Proposed Wind Farm and Proposed Grid Connection combined) will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the vicinity of the Site, as set out in Chapter 2 of this EIAR. Please see Section 2.8 of Chapter 2 for cumulative assessment methodology.

During the construction phase of the Proposed Project and the construction of other permitted or proposed projects and plans in the area (please see Section 2.8 in Chapter 2 and Appendix 2-3 of this EIAR), there will be emissions from construction plant and machinery and potential dust emissions associated with the construction activities. However, once the mitigation proposals, as outlined in the above assessment are implemented during the construction phase of the Proposed Project, there will be no cumulative negative effect on air quality.

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

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

10.4.1 Construction Phase

Air Quality

As established above in Section 10.2.2, 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, spoil management areas, substation and all other supporting infrastructure;
- Exhaust emissions through vehicle transit to and from the Site;
- Dust emissions during the construction of turbines, spoil management areas, substation and all other supporting infrastructure;
- Dust emissions through vehicle transit to and from the Site.

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

10.4.2 Operational Phase

There will be no net carbon dioxide (CO2) emissions form operation of the Proposed Project

Air Quality

As established above in Section 10.2.3, there will be a long-term imperceptible effect on air quality from:

- Exhaust emissions from maintenance LGV vehicles visiting the Site 1-2 times per day station infrastructure replacement.
- Dust emissions from maintenance LGV vehicles visiting the Site 1-2 times per day and on occasion more frequent LGV and HGV visits during component or substation infrastructure replacement.

As established above in section 10.2.3, 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 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 significant positive impact on air quality due to the offsetting of approximately 50,822 tonnes of Carbon Dioxide (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 and within the surrounding landscape be operational in parallel with

the Proposed Project. However, once the Proposed Project is operational, there will be a **long-term, moderate, positive impact on the air quality**.