Chapter 11

Air Quality

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11. Air Quality

11.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the likely air quality impacts associated with the Barnesmore Gap Greenway ('proposed development' hereafter). This chapter sets out the methodology used to undertake the assessment (Section 11.3), describes the existing environment (Section 11.4), examines the predicted impacts of the proposed development (Section 11.6), proposes mitigation and monitoring measures (Section 11.7 and Section 11.8, respectively), and identifies residual effects (Sections 11.9). The assessment of impacts has been undertaken in the context of current relevant standards and guidance and identifies any requirements or possibilities for mitigation.

This chapter should be read in conjunction with the following chapters and supporting appendices, which present related impacts arising from the proposed development and proposed mitigation measures to ameliorate the potential impacts:

- Chapter 4 Description of the Proposed Development
- Chapter 5 Traffic and Transportation
- Chapter 6 Population and Human Health
- Chapter 7 Biodiversity
- Chapter 12 Climate
- Chapter 20: Interactions and Cumulative Effects,
- Chapter 21: Summary of Mitigation and Monitoring Measures.

11.2 Policy and Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on air quality are summarised below.

In addition to specific air quality guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Department of Environment, Community and Local Government, (DECLG) (2018), *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*
- European Commission (EC) (2017), *Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report*
- Environmental Protection Agency (EPA) (2022), *Guidelines on the Information to be contained in Environmental Impact Assessment Reports*,
- Environmental Protection Agency (EPA) (2015), *Advice Notes for Preparing Environmental Impact Statements*,

The assessment has made reference to national air quality guidelines where available, in addition to international standards and guidelines relating to the assessment of air quality impacts. These are summarised below:

- (Transport Infrastructure Ireland (TII), (2025), *PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects*;
- Institute of Air Quality Management (IAQM) IAQM (2024), *Guidance on the Assessment of Dust from Demolition and Construction V2.2* (hereafter referred to as the IAQM Guidelines); and

- Institute of Air Quality Management (IAQM) IAQM (2020), *A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1)*.

11.3 Methodology

11.3.1 Study Area

The study area for this assessment covers the area of the proposed development, and the area either side of the proposed development up to a maximum distance of 250 metres (m) during the Construction Phase (as per the IAQM Guidance (IAQM, 2024). The methodology for determining this study area is described in Section 11.3.1 and the sensitive receptors identified are shown in Section 11.4.3.

11.3.2 Criteria for Rating of Impacts

11.3.2.1 Ambient Air Quality Standards

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 *of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast)*. This directive supersedes EU Directive 2008/50/EC *of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* (CAFE Directive). Directive (EU) 2024/2881 sets out air quality standards for pollutants to be reached by 2026 and by 2030 which are more closely aligned with the World Health Organisation (WHO) air quality guidelines.

The ambient air quality limit values for pollutants are set out in Annex I of Directive (EU) 2024/2881. T able 1 of Annex I in Directive (EU) 2024/2881 sets out the updated air quality limit values for pollutants to be achieved by 1 January 2030, which are more closely aligned with the WHO air quality guidelines. Table 2 of Annex I in Directive (EU) 2024/2881 sets out the limit values for air pollutants which are to be achieved by 11 December 2026 and are also applicable up to 2030. The limit values in Table 2 of Annex I are the same as the limits set under Directive 2008/50/EC and the Air Quality Standards Regulations 2022.

The Ambient Air Quality Standards Regulations 2022 (S.I. 739 of 2022) (the Air Quality Standards Regulations 2022) further transposed the CAFE Directive and revoked the Air Quality Standards Regulations 2011, as amended. With the adoption of Directive (EU) 2024/2881, Ireland must transpose this directive into national law, i.e. update the Air Quality Standards Regulations, before December 2026.

In relation to the proposed development, the applicable limit values are for nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). Table 11-1 outlines the limit values pre-2030 and post-2030 for the specified pollutants.

Table 11-1 - Ambient Air Quality Limit Values

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Limit Type	Limit Value (to be attained by 2030)
Nitrogen Dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m^3
	N/A	N/A	24-hour limit for protection of human health - not to be	50 µg/m^3

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Limit Type	Limit Value (to be attained by 2030)
			exceeded more than 18 times/year	
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as $PM_{2.5}$)	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m^3
	Annual limit for protection of human health	25 µg/m^3	Annual limit for protection of human health	10 µg/m^3

11.3.2.2 WHO Air Quality Guidelines and Cleaner Air Strategy

In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (shown in Table 11-2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. More recent data from EPA report *Air Quality in Ireland 2024* (EPA, 2025) states that 93% of stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2*".

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that "*Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II*."

These assessment thresholds relate to monitoring of ambient air quality by Member States, where "*exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years*."

Table 11-2 - WHO Air Quality Guidelines

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	24-hour limit for protection of human health	-	-	25 µg/m^3
	Annual limit for protection of human health	20 µg/m^3	-	10 µg/m^3

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
PM (as PM_{10})	24-hour limit for protection of human health	75 µg/m^3	50 µg/m^3	45 µg/m^3
	Annual limit for protection of human health	30 µg/m^3	20 µg/m^3	15 µg/m^3
PM (as $PM_{2.5}$)	24-hour limit for protection of human health	37.5 µg/m^3	25 µg/m^3	15 µg/m^3
	Annual limit for protection of human health	15 µg/m^3	10 µg/m^3	5 µg/m^3

11.3.2.3 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust that are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). The EU ambient air quality standards outlined in Table 11-1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no criteria have been stipulated for nuisance dust for this specific type of proposed development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the Proposed Development, in terms of both sensitive human and ecological receptors.

11.3.3 Survey Methodology

No on-site surveys were required for the air quality assessment. TII guidance PE-ENV-01106 states in relation to baseline air quality monitoring:

"Scheme specific air quality monitoring should only be undertaken on a proposed scheme where a quantitative local AQA (air quality assessment) is being undertaken. Furthermore, the need to undertake scheme specific air quality monitoring depends upon the availability of existing air quality data and the complexity of the proposed scheme. For example, a greenway scheme would not, in general, require monitoring as these schemes are not complex and likely to result in no or small changes in traffic flow/composition and therefore air quality effects are likely to be not significant."

As the proposed development is a greenway, and the changes in associated traffic with the proposed development did not meet the PE-ENV-01106 screening criteria for a quantitative local AQA (see Section 11.3.1 and 11.3.2), there was no site-specific baseline monitoring of NO_2, PM_{10} and $PM_{2.5}$ proposed.

The baseline air quality environment was established using available long-term EPA monitoring data for representative locations (see Section 11.4.2).

11.3.4 Assessment Methodology

11.3.4.1 Construction Phase

11.3.4.1.1 Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. The use of UK guidance is recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025).

The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into large, medium or small scale depending on the nature of the activities involved. The criteria for determining the category for the works involved are outlined in Table 11-3, these are based on the IAQM guidance (IAQM, 2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Table 11-3 - IAQM Criteria to Determine Dust Emissions Magnitude

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
• Total building volume <12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities <6m above ground • Demolition during wetter months	• Total building volume 12,000 - 75,000m^3 • Potentially dusty construction material • Demolition activities 6 - 12m above ground level	• Total building volume >75,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities >12m above ground level
Earthworks		
• Total site area <18,000m^2 • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <3 m in height • Earthworks during wetter months	• Total site area 18,000m^2 - 110,000 m^2 • Moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • Formation of bunds 3 - 6m in height	• Total site area >110,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6m in height
Construction		

Dust Emission Magnitude		
Small	**Medium**	**Large**
• Total building volume <12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)	• Total building volume 12,000 - 75,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site concrete batching	• Total building volume >75,000m^3 • On-site concrete batching • Sandblasting
Trackout (Truck Movements)		
• <20 HDV (>3.5 t) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length <50 m	• 20 – 50 HDV (>3.5 t) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50 – 100m	• >50 HDV (>3.5 t) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100m

The sensitivity of the area must then be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. In terms of ecology, high sensitivity receptors are considered locations with an international or national designation and the designated features may be affected by dust soiling. Table 11-4 outlines the criteria for determining the sensitivity of the area to dust soiling, dust-related human health and dust-related ecological effects as per the IAQM guidance (IAQM, 2024).

Table 11-4 - Criteria for Determining the Sensitivity of the Area

Sensitivity of the Area to Dust Soiling Effects on People and Property

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

Sensitivity of the Area to Human Health Impacts

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

Sensitivity of the Area to Ecological Impacts

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

Once the dust emission magnitude and sensitivity of the area have been determined the next step, according to the IAQM guidance (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 11-5.

Table 11-5 - IAQM Criteria to Determine Risk of Dust Impacts

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

11.3.4.1.2 Construction Phase Traffic Assessment

Construction phase traffic also has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025), states that road links meeting one or more of the following criteria can be defined as being '*affected*' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;

- A change in road alignment by 5m or greater.

As per Chapter 5 Traffic and Transportation in Volume 2 of this EIAR, it has been determined by the traffic specialist that the construction stage traffic will not increase by 1,000 AADT, or 200 HDV AADT. Additionally, the development will not result in speed changes or changes in road alignment. Therefore, the traffic does not meet the above scoping criteria. A detailed local air quality assessment (either via the TII Roads Emission Model (REM) tool or dispersion modelling) of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality with respect with human or ecological receptors.

There is also the potential for emissions from non-road mobile machinery (NRMM) to impact air quality. Final details of the exact plant and equipment likely to be used in the proposed development construction works areas will be determined by the appointed contractor. It is considered likely to comprise dump trucks, tracked excavators, diesel generators, asphalt spreaders, rollers, compressors and trucks. The number of plant and their location within the site are likely to be variable over the construction period. Emissions from site plant and equipment will cease at the end of the construction period. As per Section 7.3 of the Local Air Quality Management Technical Guidance (TG22) (LAQM.TG(22)) (UK DEFRA, 2022), with suitable controls and site management, on-site plant and vehicles are unlikely to make a significant impact on local air quality and have therefore been scoped out of this assessment.

11.3.4.2 Operational Phase

11.3.4.2.1 Operational Phase Traffic Assessment

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development, namely, the movement of cars accessing the various trailheads.

The proposed development aims to encourage modal shift away from private vehicles and towards active travel such as cycling, by providing a substantially segregated facility which will support the strategy's objectives of improving safety for cyclists, and has been designed to connect to multiple schools and community facilities to encourage a modal shift. This represents a beneficial effect in terms of reducing emissions from private vehicles, including greenhouse gas emissions savings as quantified and assessed in Chapter 12 Climate. It is noted that the operational phase traffic assessment (as per Chapter 5 Traffic and Transport) is based on a worst case scenario in terms of potential traffic impacts during operation of the proposed development and therefore does not incorporate traffic avoided via active travel.

The TII scoping criteria detailed in Section 11.3.2 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed local air quality assessment (either via the TII Roads Emission Model (REM) tool or dispersion modelling). The proposed development will not result in the operational phase traffic increasing by more than 1,000 AADT or 200 HDV AADT. In addition, there are no proposed changes to the traffic speeds or road alignment. Therefore, no road links impacted by the proposed development satisfy the screening criteria (Section 11.3.2). A quantitative assessment of the impact of traffic emissions on ambient air quality is not necessary as there is no potential for significant impacts to local air quality.

11.3.4.3 Difficulties Encountered

There were no difficulties encountered when undertaking this assessment.

11.4 Receiving Environment

11.4.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e.

traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest weather station collating detailed weather records is Malin Head meteorological station, which is located approximately 68 km north-east of the site and is a coastal station. However, as the majority of the proposed development is further inland, data from the inland Ballyhaise meteorological station, which is located approximately 85 km south-east of the site is considered more representative. Ballyhaise meteorological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 11-1). For data collated during five representative years (2020 – 2024), the predominant wind direction is westerly to south-westerly; the mean wind speed over the long term 30-year averaging period 1991 - 2020 is 7.8 m/s (Met Éireann, 2025).

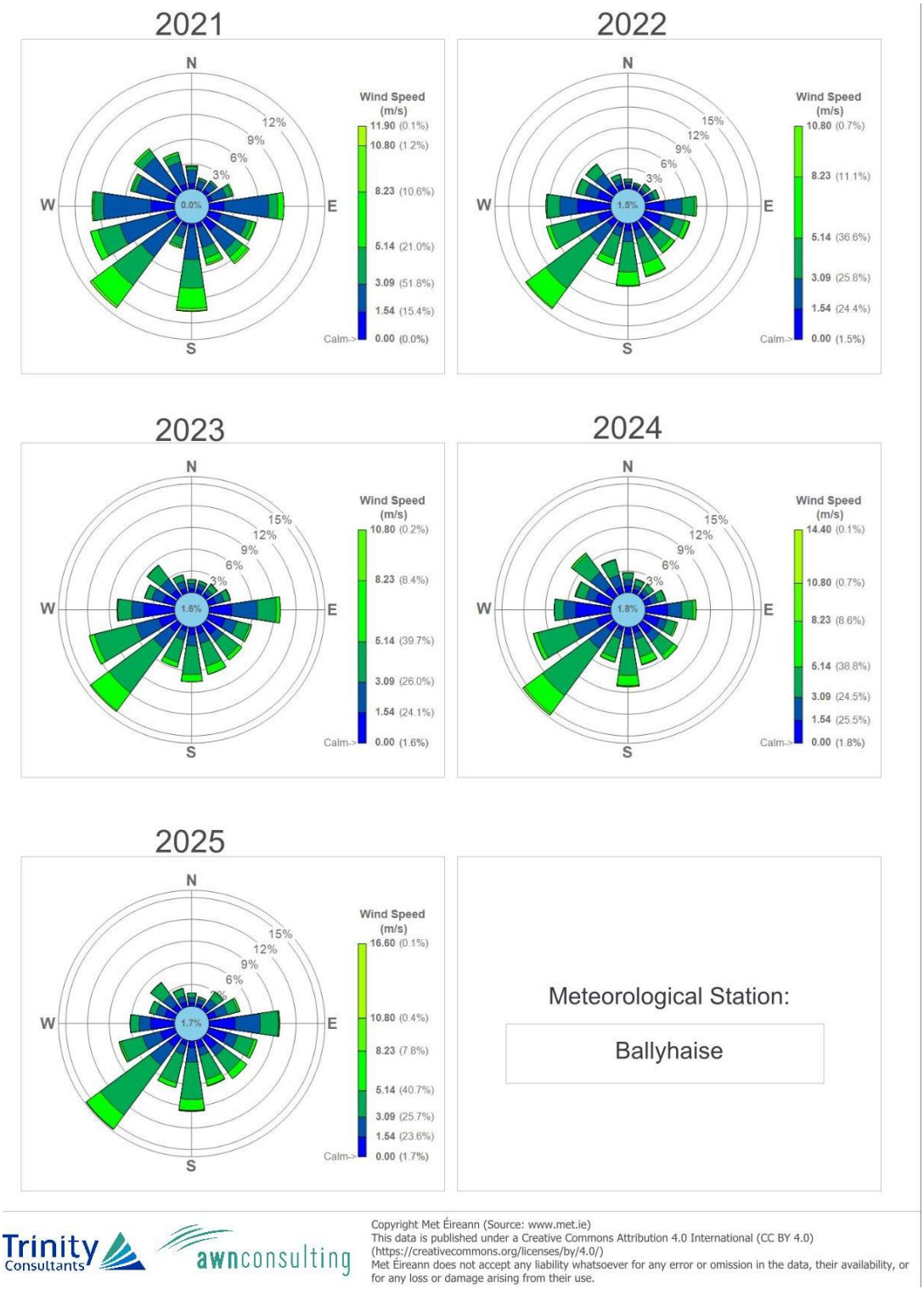

Figure 11-1 - Wind Roses for Ballyhaise Meteorological Station

11.4.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is *"Air Quality In Ireland 2024"* (EPA, 2025). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2025).

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2025). Dublin is defined as Zone A and Cork as Zone B. Zone C

is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone D (EPA, 2025). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

11.4.2.1 NO_2

Long-term NO_2 monitoring was carried out at the representative Zone D locations of Emo Court, Kilkitt, Castlebar and Edenderry for the period 2020 – 2024 (Table 11-6) (EPA, 2025). Long-term average concentrations are significantly below the annual average limits of 40 µg/m^3. Average results range from 2 – 10 µg/m^3. The overall annual average concentration for this 5-year period is 5 µg/m^3. A dditionally, there were no exceedances of the hourly limit value of 200 µg/m^3.

Based on the above information a conservative estimate of the current background NO_2 concentration for the region of the proposed development is 5 µg/m^3.

Table 11-6 - Trends in Zone D Air Quality – NO_2

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Emo Court (rural)	Annual Mean NO_2 (µg/m^3)	3	4	3	2	3
	1-hr Mean > 200 µg/m^3 (days)	0	0	0	0	0
Kilkitt (rural)	Annual Mean NO_2 (µg/m^3)	2	2	2	2	2
	1-hr Mean > 200 µg/m^3 (days)	0	0	0	0	0
Castlebar (suburban)	Annual Mean NO_2 (µg/m^3)	6	6	8	7	7
	1-hr Mean > 200 µg/m^3 (days)	0	0	0	0	0
Edenderry (suburban)	Annual Mean NO_2 (µg/m^3)	-	9	7	9	10
	1-hr Mean > 200 µg/m^3 (days)	-	0	0	0	0

11.4.2.2 PM_{10}

Continuous PM_{10} monitoring was carried out at the representative Zone D rural and suburban background locations from 2020 - 2024: Kilkitt, Claremorris, Shannon Estuary/Askeaton, Castlebar, Cobh Carrignafoy, and Enniscorthy (Table 11-7). Levels range from 7 - 15 µg/m^3 over the five-year period with at most 5 exceedances (in Enniscorthy, a suburban location) of the 24-hour limit value of 50 µg/m^3 (35 exceedances are permitted per year) (EPA, 2025). The 5-year average PM_{10} concentration at the sites suggests an average concentration of no more than 10 µg/m^3 (Table 11-7). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 10 µg/m^3.

Table 11-7 - Trends in Zone D Air Quality – PM_{10}

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
KilKitt (rural)	Annual Mean PM_{10} (µg/m^3)	8	8	9	7	7
	24-hr Mean > 50 µg/m^3 (days)	0	-	0	0	0

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Claremorris (rural)	Annual Mean PM_{10} (µg/m^3)	10	10	8	8	8
	24-hr Mean > 50 µg/m^3 (days)	0	0	0	0	0
Askeaton (rural)	Annual Mean PM_{10} (µg/m^3)	7	9	9	-	8
	24-hr Mean > 50 µg/m^3 (days)	0	0	0	-	0
Castlebar (suburban)	Annual Mean PM_{10} (µg/m^3)	14	10	11	10	10
	24-hr Mean > 50 µg/m^3 (days)	2	1	0	-	0
Cobh Carrignafoy (suburban)	Annual Mean PM_{10} (µg/m^3)	13	12	13	12	12
	24-hr Mean > 50 µg/m^3 (days)	0	1	0	-	0
Enniscorthy (suburban)	Annual Mean PM_{10} (µg/m^3)	15	14	15	13	14
	24-hr Mean > 50 µg/m^3 (days)	5	1	5	-	3

11.4.2.3 $PM_{2.5}$

Continuous $PM_{2.5}$ monitoring was carried out at the representative Zone D rural and suburban background locations from 2020 - 2024: Claremorris, Shannon Estuary/Askeaton, Cavan, Cobh Carrignafoy and Enniscorthy (Table 11-8). Levels range from 4 – 12 µg/m^3 over the five-year period (EPA, 2025). Based on the EPA data, a conservative estimate of the current background $PM_{2.5}$ concentration in the region of the proposed development is 7 µg/m^3.

Table 11-8 - Trends in Zone D Air Quality – $PM_{2.5}$

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Claremorris (rural)	Annual Mean $PM_{2.5}$ (µg/m^3)	5	8	6	5	5
Shannon Estuary / Askeaton (rural)	Annual Mean $PM_{2.5}$ (µg/m^3)	4	6	5	5	5
Cavan (suburban)	Annual Mean $PM_{2.5}$ (µg/m^3)	6	7	7	6	7
Cobh Carrignafoy (suburban)	Annual Mean $PM_{2.5}$ (µg/m^3)	8	7	8	7	7
Enniscorthy (suburban)	Annual Mean $PM_{2.5}$ (µg/m^3)	12	10	10	9	9

Based on the above information the air quality in the area is generally good, with concentrations of the key pollutants generally well below the relevant limit values.

11.4.2.4 Summary

Based on the above information the air quality at rural and suburban background sites in the Zone D area is generally good, with concentrations of the key pollutants generally well below the relevant limit values set out in Table 2 of Annex I of Directive (EU) 2024/2881. The current pollutant concentrations at all of the monitoring sites (with the exception of Enniscorthy) are also in compliance with the 2030 limit values set out in Table 1 of Annex I in Directive (EU) 2024/2881 and the clean air strategy.

11.4.3 Sensitivity of the Receiving Environment to Dust

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) prior to assessing the impact of dust from a proposed development, the sensitivity of the area must first be

assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas (ZoI previously defined in Section 11.3.1) are taken into consideration.

The impact to air quality due from construction phase activities is assessed at sensitive receptors within 250m of the development boundary. As mitigation will be applied across the whole site and to ensure a conservative assessment, all of the chainages have been assessed together. However, due to the linear nature of the proposed development, not all receptors will be impacted by all construction activities simultaneously.

In terms of receptor sensitivity to dust soiling, there are a number of highly sensitive residential properties within 250m of the proposed development boundary (Figure 11-2). There are >100 high sensitivity residential receptors within 20m of the site boundary. Based on these receptor numbers and using the IAQM criteria in Table 11-4, the sensitivity of the area to dust soiling impacts from the proposed development is high.

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 10 $\mu g/m^3$ and as discussed above, there are >100 sensitive receptors within 20 m of the site boundary. Based on the IAQM criteria outlined in Table 11-4, the worst-case sensitivity of the area to human health is considered low.

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust from construction sites deposited on vegetation may create ecological stress within the local plant community. The guidance states that dust impacts to vegetation can occur up to 50m from the site and 50m from site access roads, up to 250m for the site entrance. Lough Eske and Ardnamona Woods SAC, Lough Eske and Ardnamona Woods pNHA, Barnesmore Bog NHA, Cashelnavean Bog NHA, Croaghonagh Bog SAC, Croaghonagh Bog pNHA and River Finn SAC are all ecological sites within 20m of the site.

Based on the IAQM criteria outlined in Table 11-4 the worst-case sensitivity of the area to ecology is considered high.

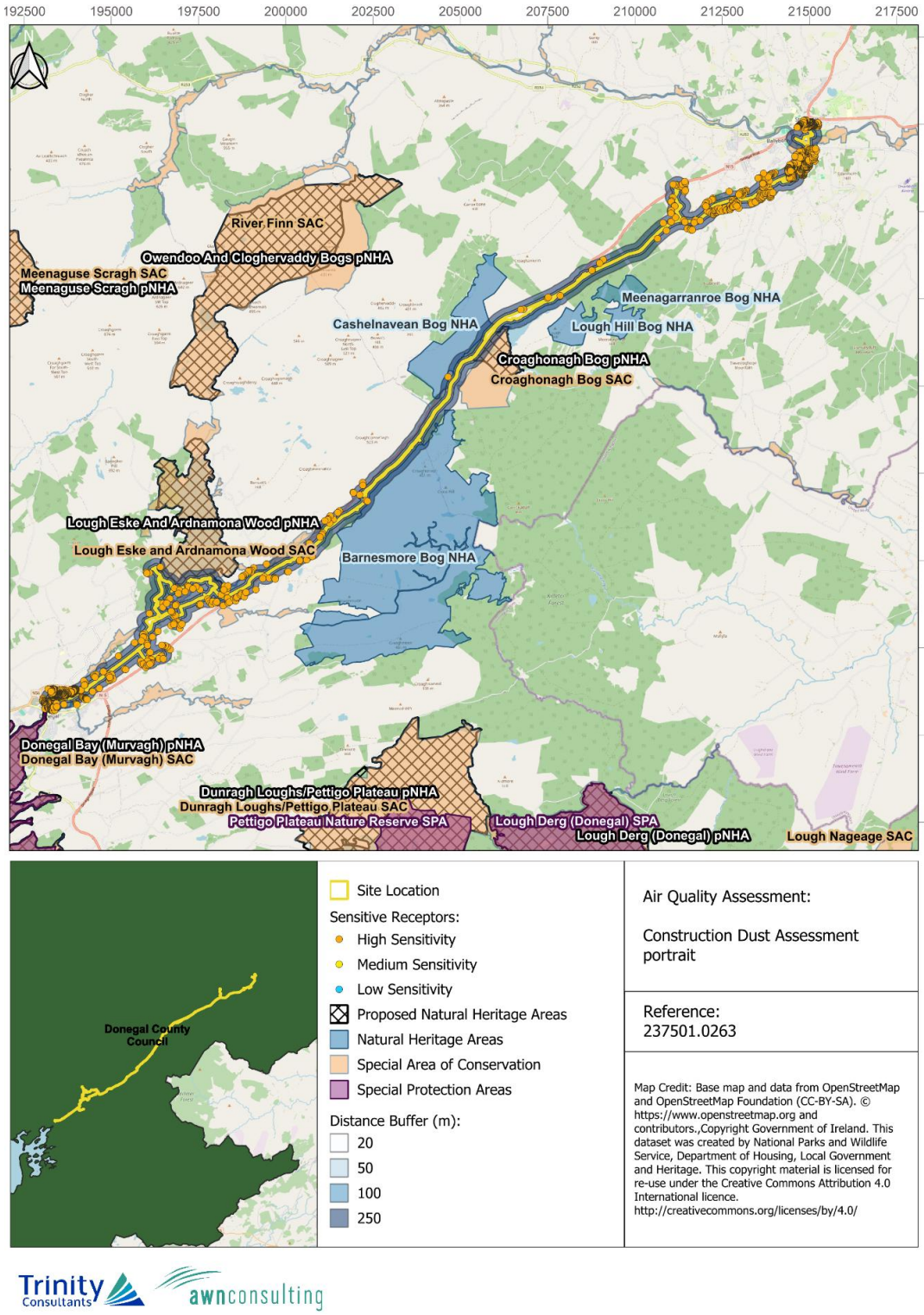

Figure 11-2 - Construction Dust Sensitive Receptors within 250m of Site

11.5 The 'Do Nothing' Scenario

In the Do-Nothing scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

11.6 Description of Potential Impacts

11.6.1 Potential Construction Impacts

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250m of a construction site, the majority of the deposition occurs within the first 50m (IAQM, 2024). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Malin Head meteorological data indicates that the prevailing wind direction is westerly to south-westerly and wind speeds are generally moderate in nature (Section 11.4.1). A review of historical 30-year average data for Malin Head indicates that on average 245.5 days per year have rainfall over 0.2 mm (Met Éireann, 2025a). Therefore, it can be determined that over 67% of the time dust generation will be negligible.

To determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (Section 11.4.3). The major dust generating activities are divided into four types within the IAQM (IAQM, 2024) guidance to reflect their different potential impacts. These are: demolition, earthworks, construction and trackout (movement of heavy vehicles).

11.6.1.1 Determining the Potential Dust Emission Magnitude

The magnitude of the works under each category can be classified as either small, medium or large depending on the scale of the works involved. The magnitude of each activity (Table 11-9) has been determined below for the proposed development using the criteria in Table 11-3.

Table 11-9 - Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude	Justification
Demolition	Small	Demolition (less than 12,000m^3) of 4-5 no. farm sheds required
Earthworks	Large	Total site area is greater than 110,000m^2
Construction	Large	More than 75,000m^3 of building to be constructed
Trackout	Large	Greater than 50 outward vehicle movements per day from construction site activities

11.6.1.2 Determining the Sensitivity of the Area

As determined in Section 11.4.3, there are greater than 100 residential properties within 20m of the proposed works area. Lough Eske and Ardnamona Woods SAC, Lough Eske and Ardnamona Woods pNHA, Barnesmore Bog NHA, Cashelnavean Bog NHA, Croaghonagh Bog SAC, Croaghonagh Bog pNHA and River Finn SAC are present within 20m of the Site boundary. The sensitivity of the area to dust soiling, human health impacts and ecological impacts from dust are shown in Table 11-10.

Table 11-10 - Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Ecology	High	High	High	High

11.6.1.3 Determining the Risk of Dust Impacts

As detailed in Table 11-5, the predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation.

Table 11-11 below provides a summary of the risk of dust impacts for the proposed development.

There is at most a high risk of dust soiling impacts, a low risk of dust-related human health impacts and a high risk of ecological impacts associated with the proposed works. Without mitigation in place, construction dust will have a ***short-term, direct, localised, negative*** and ***moderate*** impact on air quality, which may potentially have a significant effect. As a result, best practice dust mitigation measures associated with high-risk works will be implemented to ensure there are no significant impacts at nearby sensitive receptors (see Section 11.7.1).

Table 11-11 - Risk of Dust Impacts used to Define Site-Specific Mitigation

Potential Impact	Risk of Dust Impact			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	High Risk	High Risk
Human Health	Negligible Risk	Low Risk	Low Risk	Low Risk
Ecology	Medium Risk	High Risk	High Risk	High Risk

11.6.1.4 Construction Phase Traffic

A detailed air quality assessment was scoped out for the construction stage of the development as per the TII screening criteria (see Section 11.3.2). No significant construction stage effects of traffic on air quality are therefore predicted.

11.6.2 Potential Operational Impacts

A detailed air quality assessment was scoped out for the operational stage of the proposed development as per the TII screening criteria (see Section 11.3.1). No significant operational stage effects of traffic on air quality are therefore predicted.

11.7 Mitigation Measures

11.7.1 Construction Phase

Based on the assessment results in Section 11.6.1, mitigation associated with a high risk of construction dust impacts is required. Mitigation measures for high-risk sites as recommended by IAQM construction dust guidance are detailed in Table 11-12.

Table 11-12 - Construction Phase Dust Mitigation Measures.

Mitigation Measure	
Communications	The appointed contractor will put in place a Communications Plan in accordance with the employer's requirements. The Communications Plan will provide a mechanism for members of the public to communicate with the Applicant and the appointed contractor, and for the Applicant and the appointed contractor to communicate important information on various aspects of the proposed

Mitigation Measure	
	development to the public. The Communications Plan will include procedures to inform members of the community directly affected by the construction phase on schedules for any activity of a particularly disruptive nature which is likely to impinge on their property, such as boundary works, road closures and diversions, and any mitigating actions that are being taken to minimise such disruption.
	An Environmental Manager (EM) will be assigned by the appointed contractor. The EM will be responsible for co-ordinating the day-to-day management of environmental impacts during the construction phase. The EM will be responsible for performing inspections, as deemed necessary, and managing responses to environmental incidents. The name and contact details of the EM responsible for construction dust management will be displayed at construction compound hoardings.
	A complaints register will be kept by the appointed contractor detailing all telephone calls and letters of complaints received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.
Site Management	Record all dust and air quality complaints, identify cause(s), 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 offsite, and the action taken to resolve the situation in the log book.
Preparing and Maintaining the Site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
	Avoid site runoff of water or mud.
	Keep site fencing, barriers 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 cover as described below.
	Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/ machinery and sustainable travel	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 25 kph on surfaced and 15 kph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate

Mitigation Measure	
	Use enclosed chutes and 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.
Waste Management	Bonfires and burning of waste materials are legally prohibited.
Measures Specific to Demolition	Bag and remove any biological debris or damp down such material before demolition.
Measures Specific to Earthworks	Re-vegetate 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 topsoil, as soon as is practicable.
	Only remove the cover in small areas during work and not all at once.
Measures Specific to Construction	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 bulk cement and other 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 to prevent dust.
Measures Specific to Trackout	Use water-assisted dust sweeper(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 the site where reasonably practicable).
	Access gates to be located at least 10 m from receptors where possible.

11.7.2 Operation Phase

There is no mitigation required for the operational phase of the development as impacts to air quality are predicted to be ***not significant*** (see Section 11.6.2).

11.8 Monitoring

11.8.1 Construction Phase

The following monitoring measures are proposed to ensure the dust mitigation measures are working satisfactorily:

- To determine if any short-term dust impacts will occur, a minimum of daily visual inspections by the EM for dust soiling of receptors (including roads, and surfaces such as street furniture, cars and windowsills) adjoining the construction works areas will be undertaken. Inspection results will be recorded in the site inspection log. Cleaning will be provided if necessary, such as in the event of a dust complaint resulting from the proposed development construction works;
- The potential for dust generation increases when rainfall is less than 0.2mm/day (millimetres per day) and at wind speeds of greater than 10m/s (metres per second). To determine if these conditions are likely to occur, the weather forecast will be consulted daily by the EM, specifically the hourly forecasts for wind speeds as well as the 12-hour rainfall radar showing anticipated amounts of precipitation in mm; and
- The frequency of site inspections by the EM responsible for dust management will be increased to a minimum of twice daily during the above conditions. The effectiveness of dust control methods will be monitored via visual inspections and work that would generate dust (e.g. moving materials from stockpiles, or transferring loose dry materials from trucks) will be limited in so far as is practicable during these weather conditions.

11.8.2 Operational Phase

There is no monitoring recommended for the operational phase of the proposed development as impacts to air quality are predicted to be not significant.

11.9 Residual Effects

11.9.1 Construction Phase

In order to minimise dust emissions during construction, mitigation will be undertaken during construction activities, as set out in Section 11.7.1. Provided the dust minimisation measures are adhered to, the predicted residual air quality effects in terms of dust soiling and ecology during the construction phase are ***short-term, direct, localised, negative*** and ***not significant.***

Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants, to minimise generation of emissions at source. The mitigation measures that will be put in place during construction will ensure that the impact complies with all EU ambient air quality legislative limit values, which are based on the protection of human health (see Table 11-1). Therefore, the predicted residual, dust-related, human health effect of the construction phase of the proposed development is ***short-term, direct, localised, negative*** and ***not significant***.

11.9.2 Operation Phase

No significant residual effects are predicted for the operational phase of the proposed development.

11.7

11.10 References

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