Proposed Large Scale Residential Development at Rathgowan, Mullingar, Co. Westmeath

Applicant: Marina Quarter Ltd.

RECEIVED: 24/08/2023

Volume II

Main Statement

CHAPTER 7

Air Quality

August 2023

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

Table of Contents

Table of Figures

Table of Tables

7 Air Quality

7.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on air quality associated with the proposed development at Rathgowan, Mullingar, Co. Westmeath.

It should be read in conjunction with Chapter 12 'Material Assets: Traffic and Transport'.

7.2 Expertise & Qualifications

This chapter was completed by Aisling Cashell, an Environmental Consultant in the air quality section of AWN Consulting Ltd. She holds a BA and an MAI in Civil, Structural and Environmental Engineering from Trinity College Dublin. She is a member of Engineers Ireland. She specialises in the area of air quality, climate and sustainability.

7.3 Proposed Development

The proposed development at Rathgowan, Mullingar, Co. Westmeath. The proposed development will consist of a mix of residential units, landscaping and amenity areas and all associated infrastructure works. A full description of the development can be found in Chapter 2 'Site Location and Project Description'.

The proposed development comprises Phase 1 and Phase 2 of a wider masterplan development; Phase 1 and Phase 2 are located to the east of the R394 with Phase 3 located to the west of the R394. A planning application for Phase 3 was submitted to Westmeath County Council previously. The data pertaining to the Phase 3 application has been reviewed as part of the current assessment and used to inform the cumulative impact assessment.

7.3.1 Aspects Relevant to this Assessment

During the construction phase construction dust emission have the potential to impact air quality. Dust emissions will primarily occur as a result of site preparation works, earthworks and the movement of trucks on site and exiting the site. There is also the potential for engine emissions from site vehicles and machinery to impact air quality. Construction phase impacts will be short-term in duration.

Engine emissions from vehicles accessing the site have the potential to impact air quality during the operational phase of the development through the release of NO_2, PM_{10} and $PM_{2.5}$. Operational phase impacts will be long-term in duration.

7.4 Methodology

7.4.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on Air Quality is summarised below.

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Advice Note on Preparing Environmental Impact Statements – Draft (EPA, 2015);
- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 (Institute of Air Quality Management (IAQM), 2014);
- TII Guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022a) and TII Road Emissions Model (REM) online calculator tool (TII, 2022b).

7.4.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants. These limit values or “Air Quality Standards” are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed based on compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022, which incorporate European Commission Directive 2008/50/EC, which has set limit values for numerous pollutants with the limit values for NO_2, PM_{10}, and $PM_{2.5}$ being relevant to this assessment. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC) and includes ambient limit values relating to $PM_{2.5}$. The applicable limit values for NO_2, PM_{10}, and $PM_{2.5}$ are set out in Table 7.1.

Table 7.1 Ambient Air Quality Standards & TA Luft

Pollutant	Regulation Note 1	Limit Type	Value
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 mg/m²/day
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m³
		Annual limit for protection of human health	40 µg/m³
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m³ PM_{10}
		Annual limit for protection of human health	40 µg/m³ PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m³ $PM_{2.5}$

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

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 7.2). 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/m³. 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*". Ireland will revise its air quality legislation in line with the proposed EU revisions to the CAFE Directive, which will set interim 2030 air quality standards and align the EU more closely with the WHO targets.

Table 7.2 WHO Air Quality Guidelines

Pollutant	Regulation	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	WHO Air Quality Guidelines	24-hour limit for protection of human health	50µg/m³ NO_2	50µg/m³ NO_2	25µg/m³ NO_2
		Annual limit for protection of human health	30µg/ m³ NO_2	20µg/ m³ NO_2	10µg/m³ NO_2
PM (as PM_{10})		24-hour limit for protection of human health	75µg/ m³ PM_{10}	50µg/m³ PM_{10}	45µg/m³ PM_{10}
		Annual limit for protection of human health	30µg/ m³ PM_{10}	20µg/ m³ PM_{10}	15µg/m³ PM_{10}
PM (as $PM_{2.5}$)		24-hour limit for protection of human health	37.5µg/m³ $PM_{2.5}$	25µg/m³ $PM_{2.5}$	15µg/m³ $PM_{2.5}$
		Annual limit for protection of human health	15µg/m³ $PM_{2.5}$	10µg/m³ $PM_{2.5}$	5µg/m³ $PM_{2.5}$

7.4.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust, which are less than 10 microns, and the EU ambient air quality standards outlined in Section 7.4.1.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard 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.

However, guidelines for 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/m²/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/m²/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.

7.4.2 Site Surveys/Investigation

No on-site surveys were required for the air quality assessment. The baseline air quality environment was established using available long-term EPA monitoring data for representative locations (see Section 7.5.2)

7.4.3 Consultation

A Section 247 and a Section 32B meetings were held with the Council. Additional consultation with specific relevant bodies was not required as part of the air quality assessment.

7.4.4 Construction Phase Methodology

The Institute of Air Quality Management in the UK (IAQM) guidance document 'Guidance on the Assessment of Dust from Demolition and Construction' (2014) 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 in order 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, 2022a).

The major dust generating activities are divided into four types within the IAQM guidance (2014) 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 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.

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, 2022a), 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.

The construction stage traffic will not increase by 1,000 AADT or 200 HDV AADT and therefore does not meet the above scoping criteria. In addition, there are no proposed changes to the traffic speeds or road alignment. As a result a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

7.4.5 Operational Phase Methodology

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development. The TII scoping criteria detailed in Section7.4.4 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed air dispersion modelling assessment. The proposed development will result in the operational phase traffic increasing by more than 1,000 AADT on a number of road links. Therefore, a detailed air dispersion modelling assessment of operational phase traffic emissions was conducted.

The impact to air quality as a result of changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. The TII guidance (2022a) states a proportionate number of representative receptors which are located in areas which will experience the highest concentrations or greatest improvements as a result of the proposed development are to be included in the modelling. The TII criteria state that receptors within 200m of impacted road links should be assessed; roads which are greater than 200m from receptors will not impact pollutant concentrations at that receptor. The TII guidance (2022a) defines sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. A total of 3 no. high sensitivity residential receptors (R1 – R3) were included in the modelling assessment (see Figure 7.1).

The TII guidance (2022a) states that modelling should be conducted for NO_2, PM_{10} and $PM_{2.5}$ for the base, opening and design years for both the Do Minimum (Do Nothing) and Do Something scenarios. Modelling of operational NO_2, PM_{10} and $PM_{2.5}$ concentrations has been conducted for the Do Nothing and Do Something scenarios using the TII Road Emissions Model (REM) online calculator tool (TII, 2022b).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The *Default* fleet mix option was selected along with the *Intermediate Case* fleet data base selection, as per TII Guidance (TII, 2022b). The *Intermediate Case* assumes a linear interpolation between the *Business as Usual* case – where current trends in vehicle ownership continue and the *Climate Action Plan (CAP)* case – where adoption of low emission light duty vehicles occurs.

Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the identified sensitive receptors using generic meteorological data. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM_{10} emissions associated with brake and tyre wear (TII, 2022b). The predicted road contributions are then added to the existing background concentrations to give the predicted ambient concentrations. The ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.

The TII document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022a) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do Nothing scenario. The TII significance criteria are outlined in Table 4.9 of *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022a) and reproduced in Table 7.3 below. These criteria have been adopted for the proposed development to predict the impact of NO_2 and PM_{10} emissions as a result of the proposed development.

Table 7.3 Air Quality Significance Criteria

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Standard Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source: TII (2022a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

7.4.5.1 Traffic Data Used in Modelling Assessment

Traffic flow information was obtained from TOBIN Consulting Engineers for the purposes of this assessment. Data for the Base Year 2025 and the Do Nothing and Do Something scenarios for the Opening Year 2025 and Design Year 2040 were provided. Specific cumulative developments have also been included in the traffic data for the assessment. These developments include committed developments Rathgowan Phase 3 (Planning Ref. 22/515). Traffic associated with a number of schools in the area that are not currently at full capacity was also included. Further details of the committed developments can be found in the Traffic and Transport Assessment prepared by TOBIN Consulting Engineers and submitted with this planning application.

The traffic data is detailed in Table 7.4. Only road links that met the TII scoping criteria and that were within 200m of receptors were included in the modelling assessment. Background concentrations have been included as per Section 7.5.2 of this chapter based on available EPA background monitoring data (EPA, 2022).

Table 7.4 Traffic Data used in Operational Phase Air Modelling Assessment

Road Name	Speed (kph)	Base Year	Opening Year		Design Year	
			Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
Junction 1 C - R394 (South)	50	11976 (529)	13437 (652)	14819 (652)	16359 (930)	17740 (930)
Junction 2 A - R394 (North)	50	11988 (529)	13450 (652)	14655 (652)	16374 (930)	17579 (930)
Junction 2 C - R394 (South)	50	11988 (529)	13450 (652)	14656 (652)	16374 (930)	17580 (930)

Figure 7.1 Location of Sensitive Receptors used in Operational Phase Air Quality Assessment

7.4.6 Difficulties Encountered

There were no difficulties encountered in compiling this assessment.

7.5 Baseline Environment

7.5.1 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 representative weather station collating detailed weather records is Mullingar meteorological station, which is located less than 1 km north of the proposed development. Mullingar met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 7.2). For data collated during five representative years (2017 – 2021), the predominant wind direction is southerly to south-westerly with a mean wind speed of 3.9 m/s over the 30-year period 1979 – 2008 (more recent 30-year averages are not available) (Met Eireann, 2023).

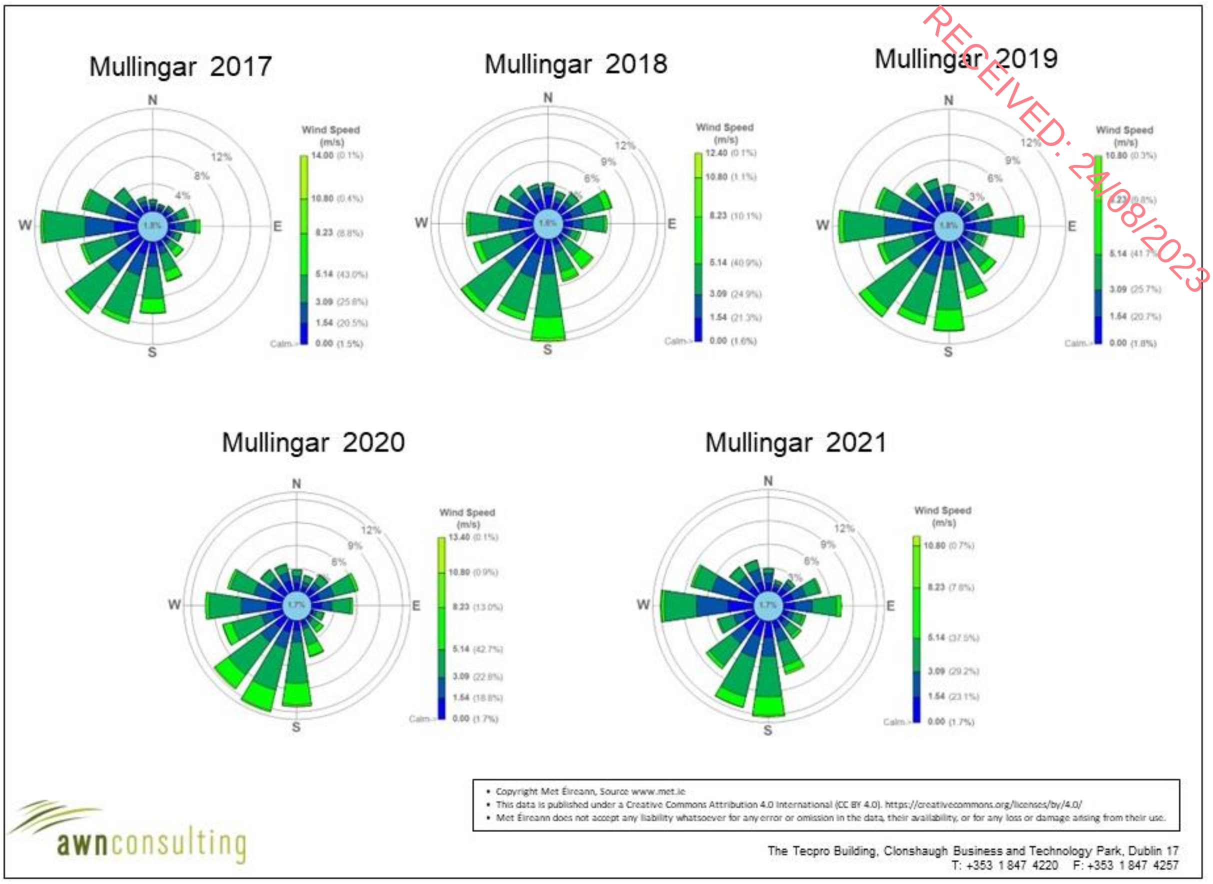

Figure 7.2 Windrose 2017-2021 (Source: Met Eireann, 2023)

7.5.2 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 2021" (EPA, 2022a). 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, 2022b).

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2022b). 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 C (EPA, 2022b). 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.).

In 2020 the EPA reported (EPA, 2022a) that Ireland was compliant with EU legal air quality limits at all locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA Air Quality in Ireland 2020 report details the effect that the Covid-19 restrictions had on air monitoring stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. The report also notes that CSO figures show that while traffic volumes are still slightly below 2019 levels, they have significantly increased since 2020 levels. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. For this reason, they have not been included in the baseline section and previous long-term data has been used to determine baseline levels of pollutants in the vicinity of the proposed development.

7.5.2.1 NO_2

Long-term NO_2 monitoring was carried out at three Zone C locations for the period 2017 – 2021, Kilkenny, Portlaoise and Dundalk (EPA, 2022a). Annual mean concentrations of NO_2 range from 4 – 14 µg/m^3 over the 2017 – 2021 period (Table 7.5). Long term average concentrations are significantly below the annual average limit of 40 µg/m^3. Based on the above information, a conservative estimate of the current background NO_2 concentration in the region of the proposed development is 15 µg/m^3.

Table 7.5 Trends in Zone C Air Quality – Nitrogen Dioxide (NO_2)

Station	Averaging Period Note 1	Year				
		2017	2018	2019	2020	2021
Kilkenny	Annual Mean NO_2 (µg/m^3)	5	6	5	4	4
	99.8 1-hr NO_2 (µg/m^3)	41	45	42	40	35
Portlaoise	Annual Mean NO_2 (µg/m^3)	11	11	11	8	8
	99.8 1-hr NO_2 (µg/m^3)	60	68	60	52	49
Dundalk	Annual Mean NO_2 (µg/m^3)	-	-	12	10	11
	99.8 1-hr NO_2 (µg/m^3)	-	-	69	73	67

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022). 1-hour limit value - 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

7.5.2.2 PM_{10}

Continuous PM_{10} monitoring was carried out at four Zone C locations from 2017 – 2021, Galway, Ennis, Portlaoise and Dundalk. Concentrations range from 12 – 120 µg/m^3 over the period (Table 7.6). Average concentrations across the five years (2017 to 2021) was 11.8 µg/m^3 for Portlaoise, 13.4 µg/m^3 for Dundalk and higher at 17.8 µg/m^3 for Ennis. Hence, long term concentrations are significantly below the annual limit value of 40 µg/m^3. In addition, there were at most 19 exceedances (in Ennis) of the 24-hour limit value of 50 µg/m^3 in 2021, albeit 35 exceedances are permitted per year (EPA, 2022a). Based on the EPA data, an estimate of the current background PM_{10} concentration in the region of the development is 14 µg/m^3.

Table 7.6 Trends in Zone C Air Quality – PM_{10}

Station	Averaging Period Note 1	Year				
		2017	2018	2019	2020	2021
Athlone	Annual Mean PM_{10} (µg/m^3)	-	-	17	16	12
	24-hr Mean > 50 µg/m^3 (days)	-	-	0	3	2
Ennis	Annual Mean PM_{10} (µg/m^3)	16	16	18	20	19
	24-hr Mean > 50 µg/m^3 (days)	9	4	12	19	17
Portlaoise	Annual Mean PM_{10} (µg/m^3)	10	11	15	12	11
	24-hr Mean > 50 µg/m^3 (days)	0	1	0	0	1
Dundalk	Annual Mean PM_{10} (µg/m^3)	-	15	14	13	12
	24-hr Mean > 50 µg/m^3 (days)	-	0	2	2	0

Note1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022). Daily limit value - 50 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

7.5.2.3 $PM_{2.5}$

Average $PM_{2.5}$ levels in Ennis over the period 2017 – 2021 ranged from 10 – 15 µg/m^3, with a $PM_{2.5}/PM_{10}$ ratio ranging from 0.63 – 0.8 (EPA, 2022a). Based on this information, a ratio of 0.7 was used to generate an existing $PM_{2.5}$ concentration in the region of the proposed development of 9.3 µg/m^3.

The current background concentrations have been used in the operational phase air quality assessment for both the Opening Year and Design Year as a conservative approach in order to predict pollutant concentrations in future years. This is in line with the TII methodology (TII, 2022a).

Based on the above information the air quality in Zone C locations, such as the Mullingar area is generally good, with concentrations of the key pollutants generally well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO_2 with the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2022a).

7.5.3 Sensitivity of the Receiving Environment

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (2014) 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 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, schools and hospitals.

In terms of receptor sensitivity to dust soiling, there are a small number of high sensitivity residential properties within 100m of the site boundary (see Figure 7.3). There are 39 properties within 100m, 17 within 50m and 14 within 20m of the site boundary. Therefore, the overall sensitivity of the area to dust soiling impacts is considered high based on the IAQM criteria outlined in Table 7.7.

Table 7.7 Sensitivity of the Area to Dust Soiling Effects on People and Property

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

Source (IAQM, 2014) Guidance on the Assessment of Dust from Demolition and Construction

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 11 µg/m^3 and there is 1 no. high sensitivity receptor within 20m of the Proposed Development boundary (see Figure 7.3). Based on the IAQM criteria outlined in Table 7.8, the worst-case sensitivity of the area to human health is considered low.

Table 7.8 Sensitivity of the Area to Dust Related Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)				
			<20	<50	<100	<200	<350
High	< 24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	**Low**	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low	Low

Source (IAQM, 2014) Guidance on the Assessment of Dust from Demolition and Construction

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50m from the site and 50m from site access roads, up to 500m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present.

The closest designated sites are Lough Owel SPA/Lough Owel SAC are 4km to the northwest of the site and Lough Ennell SAC is located 4km to the south of the site. Lough Sheever Fen/Slevin's Lough Complex (pNHA) are 4km to the northeast of the site. The Royal Canal (pNHA) runs easterly from the north to the south of the site. Walshestown Fen (pNHA) is located 4km to the west of the site. High sensitivity ecological receptors are sites with European or National designation with particularly dust sensitive species present. These designated areas will be unaffected by dust emissions due to the distance from the works. The designated sites are all more than 50m away from the proposed development which is the area of potential impact as per IAQM guidelines (IAQm 2014).

Figure 7.3 Sensitive Receptors within 20m, 50m and 100m of Site Boundary

7.6 The 'Do Nothing' Scenario

Under the Do Nothing Scenario no construction works associated with the Phase 1 and Phase 2 development will take place and the previously identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. Impacts from increased traffic volumes and associated air emissions from the proposed Phase 1 and Phase 2 development will also not occur. However, the proposed development is part of a wider masterplan site and a planning application for the Phase 3 development has been submitted to Westmeath County Council and granted and therefore development on the site in the absence of Phase 1 and Phase 2 will likely occur.

It is proposed to develop the entire masterplan site on a phased basis, and therefore impacts as a result of construction works and increased traffic will still occur albeit to a lesser extent due to the smaller scale of development. Further details of the construction phasing strategy can be found in Chapter 2 and the CEMP. This scenario is considered neutral in terms of air quality.

7.7 Potential Significant Effects

7.7.1 Construction Phase

7.7.1.1 Air Quality

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 350m of a construction site, the majority of the deposition occurs within the first 50 m. 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 Mullingar meteorological data indicates that the prevailing wind direction is south-westerly to southerly and wind speeds are generally moderate in nature (see Section 7.5.1). In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30 year average data for Mullingar meteorological station indicates that on average 209 days per year have rainfall over 0.2 mm (Met Eireann, 2022) and therefore it can be determined that 57% of the time dust generation will be reduced.

In order 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 (see Section 7.5.3). As per Section 7.4.4, the major dust generating activities are divided into four types within the IAQM guidance 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).

7.7.1.1.1 Demolition

There are no demolition activities associated with the Proposed Development. Therefore, there is no demolition impact predicted as a result of the works.

7.7.1.1.2 Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: Total site area > 10,000m^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 > 8m in height, total material moved >100,000 tonnes;

Medium: Total site area 2,500m^2 – 10,000m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4m – 8m in height, total material moved 20,000 – 100,000 tonnes;

Small: Total site area < 2,500m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

The dust emission magnitude for the proposed earthwork activities can be classified as **large** as the total material moved (both excavations and infilling works) will be more than 100,000 tonnes.

The sensitivity of the area, as determined in Section 7.5.3, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 7.9, this results in an overall high risk of dust soiling impacts and, as outlined in Table 7.8, a low sensitivity of dust related human health impacts as a result of the proposed earthworks activities.

Table 7.9 Risk of Dust Impacts – Earthworks

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

7.7.1.1.3 Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: Total building volume > 100,000 m^3, on-site concrete batching, sandblasting;

Medium: Total building volume 25,000m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;

Small: Total building volume < 25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude for the proposed construction activities can be classified as **medium** as the total building volume is likely between 25,000m^3 and 100,000 m^3. As outlined in Table 7.10, this results in an overall medium risk of dust soiling impacts and a low sensitivity of human health impacts as a result of the proposed construction activities.

Table 7.10 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

7.7.1.1.4 Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;

Medium: 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;

Small: < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as medium, as at worst-case peak periods there will be between 10 and 50 outward HGV movements per day. As outlined in Table 7.11, this results in an overall medium risk of dust soiling impacts and a low sensitivity risk of human health impacts as a result of the proposed trackout activities.

Table 7.11 Risk of Dust Impacts – Trackout

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

7.7.1.1.5 Summary of Dust Emission Risks

The risk of dust impacts as a result of the Proposed Development are summarised in Table 7.12 for each activity. The magnitude of risk determined is used to prescribe the level of site-specific mitigation required for each activity in order to prevent significant impacts occurring.

There is at most a high risk of dust soiling and human health impacts associated with the proposed works. Best practice dust mitigation measures will be implemented to ensure there are no significant impacts at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be temporary, negative and imperceptible.

Table 7.12 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Emission Magnitude	-	Large	Medium	Medium
Dust Soiling Risk	-	High Risk	Medium Risk	Medium Risk
Human Health Risk	-	Low Risk	Low Risk	Low Risk
Ecological Risk	-	-	-	-

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the Proposed Development satisfy the TII scoping assessment criteria in Section 7.4.4. It can therefore be determined that the construction stage traffic will have an imperceptible, direct, neutral and temporary impact on air quality.

7.7.1.2 Human Health

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Table 7.12, the surrounding area is of low sensitivity to dust-related human health impacts. In addition, there is at most a low risk of dust-related human health impacts as a result of the proposed construction works. In the absence of mitigation there is the potential for short-term, negative and imperceptible impacts to human health as a result of construction dust emissions.

7.7.2 Operational Phase

7.7.2.1 Air Quality

The potential impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The traffic data includes the Do Nothing and Do Something scenarios (see Section7.4.5). The impact of NO_2, PM_{10} and $PM_{2.5}$ emissions for the Opening and Design Years was predicted at the nearest sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined.

The TII guidance PE-ENV-01106 (TII, 2022a) details a methodology for determining air quality impact significance criteria for TII road schemes and infrastructure projects. However, this significance criteria can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do-Nothing' scenario, which assumes that the proposed development is not in place in future years, in order to determine the degree of impact.

The results of the assessment of the impact of the proposed development on NO_2 in the Opening Year 2025 and Design Year 2040 are shown in Table 7.13. The annual average concentration is in compliance with the limit value at the worst-case receptors in 2025 and 2040. Concentrations of NO_2 are at most 47% of the annual limit value in 2025 and 41% of the annual limit value in 2040. There are predicted to be some increases in traffic between the Opening and Design years. Therefore, any decrease in concentration is due to increased uptake in electric vehicles and lower vehicle exhaust emissions. In addition, the TII guidance (2022a) states that the hourly limit value for NO_2 of 200 µg/m^3 is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m^3. As predicted NO_2 concentrations are significantly below 60 µg/m^3 (Table 7.13) it can be concluded that the short-term NO_2 limit value will be complied with at all receptor locations.

The impact of the proposed development on annual mean NO_2 concentrations can be assessed relative to “Do Nothing (DN)” levels. NO_2 concentrations at the receptors assessed will increase as a result of the proposed development when compared with the Do-Nothing scenario. There will be at most an increase of 0.27 µg/m^3 at receptor R1, this is a 1.4% change from baseline conditions. Where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7.1) and there is a less than 5% change in concentrations compared with the Do-Nothing scenario, then the impact is considered neutral as per the TII significance criteria (see Table 7.3). Therefore, the impact of the proposed development on NO_2 concentrations is neutral.

In relation to changes in PM_{10} concentrations due to the proposed development, the results of the assessment can be seen in Table 7.14 for the Opening Year 2025 and Design Year 2040. The annual average concentration is in compliance with the limit value at the worst-case receptors in 2025 and 2040. Concentrations of PM_{10} are at most 42% of the annual limit value in 2025 and 2040. In addition, the proposed development will not result in any exceedances of the daily PM_{10} limit value of 50 µg/m^3. The impact of the proposed development on annual mean PM_{10} concentrations can be assessed relative to “Do Nothing (DN)” levels. PM_{10} concentrations at the receptors assessed will increase as a result of the proposed development when compared with the Do-Nothing scenario. There will be at most an increase of 0.12 µg/m^3 at receptor R1, this is a 0.8% change from baseline conditions. As with NO_2, where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7.1) and there is a less than 5% change in concentrations compared with the Do-Nothing scenario then the impact is considered neutral as per the TII significance criteria (see Table 7.3). Therefore, the impact of the proposed development on PM_{10} concentrations is neutral.

The results of the assessment of changes in $PM_{2.5}$ concentrations due to the proposed development, can be seen in Table 7.15 for the Opening Year 2025 and Design Year 2040. The annual average concentration is in compliance with the limit value at the worst-case receptors in 2025 and 2040. Concentrations of $PM_{2.5}$ are at most 52% of the annual limit value in 2025 and 2040. The impact of the proposed development on annual mean $PM_{2.5}$ concentrations can be assessed relative to “Do Nothing (DN)” levels. $PM_{2.5}$ concentrations at the receptors assessed will increase as a result of the proposed development when compared with the Do-Nothing scenario. There will be at most an increase of 0.08 µg/m^3 at receptor R1, this is a 0.7% change from baseline conditions. As with NO_2 and PM_{10}, where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7.1). There is a less than 5% change in concentrations compared with the Do-Nothing scenario then the impact is considered neutral as per the TII significance criteria (see Table 7.3). Therefore, the impact of the proposed development on $PM_{2.5}$ concentrations is neutral.

Overall, the impact of the proposed development on ambient air quality in the operational stage is considered long-term, localised, neutral, imperceptible and non-significant.

Table 7.13 Annual Mean NO_2 Concentrations (μg/m³)

Receptor	Impact Opening Year				
	DN	DS	DS-DN	% Change of AQAL	Description
R1	18.7	18.9	0.27	0.68%	Negligible
R2	18.1	18.3	0.21	0.53%	Negligible
R3	16.9	17.1	0.13	0.32%	Negligible
Receptor	Impact Design Year				
	DN	DS	DS-DN	% Change of AQAL	Description
R1	16.3	16.4	0.03	0.08%	Negligible
R2	16.1	16.2	0.03	0.08%	Negligible
R3	15.7	15.7	0.02	0.05%	Negligible

Table 7.14 Annual Mean PM_{10} Concentrations (μg/m³)

Receptor	Impact Design Year				
	DN	DS	DN	% Change of AQAL	DN
R1	15.8	15.9	0.12	0.30%	Negligible
R2	15.6	15.7	0.09	0.23%	Negligible
R3	15.0	15.0	0.06	0.15%	Negligible
Receptor	Impact Design Year				
	DN	DS	DN	% Change of AQAL	DN
R1	16.0	16.0	0.04	0.10%	Negligible
R2	15.7	15.7	0.03	0.08%	Negligible
R3	15.0	15.1	0.02	0.05%	Negligible

Table 7.15 Annual Mean $PM_{2.5}$ Concentrations (µg/m³)

Receptor	Impact Design Year				
	DN	DS	DN	% Change of AQAL	DN
R1	12.1	12.2	0.08	0.20%	Negligible
R2	11.9	12.0	0.05	0.13%	Negligible
R3	11.6	11.6	0.04	0.10%	Negligible
Receptor	**Impact Design Year**				
	DN	DS	**DN**	% Change of AQAL	**DN**
R1	12.1	12.2	0.03	0.07%	Negligible
R2	12.0	12.0	0.02	0.05%	Negligible
R3	11.6	11.6	0.01	0.02%	Negligible

7.7.2.2 Human Health

Traffic related air emissions have the potential to impact air quality which can affect human health. However, air dispersion modelling of traffic emissions has shown that levels of all pollutants are below the ambient air quality standards set for the protection of human health. It can be determined that the impact to human health during the operational stage is long-term, direct, neutral and imperceptible.

7.7.3 Cumulative Effects

7.7.3.1 Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction phase of any other development within 350m then there is the potential for cumulative construction dust impacts. The construction of the proposed development has the potential to coincide with Phase 3 of the overall masterplan development for the area within the Applicant's ownership. When considering the construction of the masterplan site as a whole there is the potential for dust soiling impacts within 100m of site activities. There are a number of high sensitivity residential properties within 100m of the masterplan site boundary.

However, construction works will not be undertaken on the full site at any one time therefore, a smaller number of receptors will be impacted at any one time. Furthermore, a high level of dust control will be implemented across the site which will avoid significant dust emissions. Provided these mitigation measures are in place for the duration of the demolition and construction phase, cumulative dust related impacts to nearby sensitive receptors are not predicted to be significant. Cumulative impacts to air quality will be short-term, localised, negative and imperceptible.

There are no significant cumulative impacts to air quality predicted for the construction phase.

Chapter 7 'Air Quality' of the EIAR prepared for Phase 3 of the masterplan proposed a high level of dust mitigation to prevent significant impacts to nearby sensitive receptors. The measures proposed as part of Chapter 7 of the Phase 3 of the masterplan EIAR are incorporated in to the Construction Environmental Management Plan. The assessment concludes that once mitigation is in place impacts will be short-term, negative localised and imperceptible. In addition, best practice dust control measures will be implemented across the Phase 1 and Phase 2 sites which aligns with that proposed for the Phase 3 site. This will avoid significant dust emissions. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development are deemed short-term, negative, slight and not significant.

There are no significant cumulative impacts to air quality predicted for the construction phase.

7.7.3.2 Operational Phase

The traffic data reviewed for the operational stage impacts to air quality included the cumulative traffic associated with Phase 3 of the overall masterplan development. Any committed developments of significance require inclusion within the traffic assessment and therefore have been assessed as part of Section 7.7.2.1. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term, direct, neutral and imperceptible with regards to air quality.

There are no significant cumulative impacts to air quality predicted for the operational phase.

7.8 Mitigation

7.8.1 Construction Phase Mitigation

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following mitigation measures have been recommended by drawing on best practice guidance from Ireland, the UK (IAQM (2014), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

Site Management

The aim is to ensure good site management by preventing dust from becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 7.2 for the windrose for Mullingar Meteorological Station). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (IAQM, 2014; UK ODPM, 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods were care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

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 specific operations where there is a high potential for dust production, and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, 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 Vehicles / 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 20 kph 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.

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.
- 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

- Avoid bonfires and the burning of waste materials.

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 practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

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 power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

Site roads (particularly unpaved) can be a significant source of fugitive dust from construction sites if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK ODPM, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles.
- 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. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- 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.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to the control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation measures can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

7.8.2 Operational Phase Mitigation

The impact of the operational traffic associated with proposed development on air quality is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required.

7.8.3 Cumulative Mitigation

The construction phase mitigation measures proposed for this application are in line with those proposed for the Phase 3 development. Therefore, no additional measures are required.

7.9 Residual Impact Assessment

7.9.1 Construction Phase

7.9.1.1 Air Quality

Once the dust minimisation measures outlined in Section 7.8.1 are implemented, the impact of the proposed development in terms of dust soiling will be short-term, negative, localised and imperceptible at nearby receptors.

7.9.1.2 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active 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 of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development will be negative, short-term and imperceptible with respect to human health.

7.9.2 Operational Phase

7.9.2.1 Air Quality

Air dispersion modelling of operational traffic emissions associated with the proposed development was carried out using the TII REM tool. The modelling assessment determined that the change in emissions of NO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors as a result of the proposed development will be imperceptible. Therefore, the operational phase impact to air quality is long-term, direct, localised and imperceptible.

7.9.2.2 Human Health

As the air dispersion modelling has shown, emissions of air pollutants are significantly below the ambient air quality standards which are based on the protection of human health, impacts to human health are long-term, direct and imperceptible.

7.9.3 Cumulative Impact

7.9.3.1 Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction phase of any other developments within 350m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. However, provided the mitigation measures outlined in Section 7.8, are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted.

7.9.3.2 Operational Phase

The traffic data used to assess the operational stage impacts to air quality included the cumulative traffic associated with the proposed development as well as other existing and permitted developments in the local area (see Chapter 12 'Material Assets: Traffic and Transport'). Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term and imperceptible with regards to air quality.

7.10 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to air quality associated with the proposed development and the masterplan development due to the nature and scale of the development. The proposed development is residential in nature and will not require large scale quantities of hazardous materials or fuels.

7.11 Significant Interactions

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between population and human health and air quality. An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is short-term, imperceptible and negative with respect to population and human health during construction and long-term, imperceptible and neutral during operation phase.

Interactions between air quality and traffic (Chapter 12) can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be long-term, imperceptible and neutral.

Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Change Chapter (Chapter 8). There is no impact on climate due to air quality however the sources of impacts on air quality and climate are strongly linked.

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils.

As set out in Chapter 5 (Land, Soils & Geology), dust generation can occur during extended dry weather periods as a result of construction traffic. Dust suppression measures (e.g. dampening down) will be implemented as necessary during dry periods and vehicle wheel washes will be installed, for example. The works involve stripping of topsoil and excavations, which will remove some vegetation such as trees and scrub. It will also generate dust and potentially impact on the air quality in the locality. However, the generation of dust will be temporary during construction phase and is not anticipated to have a significant impact on biodiversity.

The impact of the interactions between land, climate, soils and geology, biodiversity and air quality are considered to be short-term, imperceptible and neutral.

No other significant interactions with air quality have been identified.

7.12 References & Sources

BRE (2003) Controlling Particles, Vapours & Noise Pollution from Construction Sites

Department of the Environment Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities

Dublin City Council (2018) Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition

Environmental Protection Agency (2015) Advice Notes for Preparing Environmental Impact Statements – Draft

Environmental Protection Agency (2022) Air Quality Monitoring Report 2021 (& previous annual reports)

Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft

Government of Ireland (2023a) Clean Air Strategy for Ireland

Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1

Met Éireann (2023) Met Eireann website: https://www.met.ie/

The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings

Transport Infrastructure Ireland (2022a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

Transport Infrastructure Ireland (2022b) TII Road Emissions Model (REM): Model Development Report – GE-ENV-01107

UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance

USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures

World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)