10.0 AIR QUALITY AND CLIMATE

10.1 INTRODUCTION

This chapter evaluates the impacts which the proposed development may have on Air Quality & Climate as defined in the Environmental Protection Agency (EPA) document Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022b) and Draft Advice Notes for Preparing Environmental Impact Statements (EPA, 2015).

10.1.1 Statement of Competency

This chapter of the EIAR has been prepared by the following staff of AWN Consulting Ltd:

Niamh Nolan is an environmental consultant in the air quality section of AWN Consulting Ltd. She holds a BSocSci (Hons) in Social Policy and Geography from University College Dublin. She is an Associate Member of both the Institute of Air Quality Management and the Institution of Environmental Science. She has experience in mapping software primarily in QGIS and she specialises in the area of air quality, climate and sustainability.

Dr. Jovanna Arndt (Senior Air Quality Consultant) holds a BSc (Hons) in Environmental Science, a PhD in Atmospheric Chemistry and is a member of the Institute of Air Quality Management. Jovanna has specialised in air quality since 2010 and has extensive knowledge of air dispersion modelling of a variety of infrastructure projects, including power stations, and is experienced in monitoring and managing the associated air quality impacts.

10.2 METHODOLOGY

10.2.1 Criteria for Rating of Impacts

10.2.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, National and European statutory bodies 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 on the basis of 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 a number of pollutants with the limit values for NO_2, PM_{10} and $PM_{2.5}$ being relevant to this assessment (see Table 10.1). 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).

Table 10-1: Air Quality Standards 2011 (Based on Directive 2008/50/EC)

Pollutant	Regulation Note 1	Limit Type	Value
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/m^3 PM_{10}
		Annual limit for protection of human health	40 µg/m^3 PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3 $PM_{2.5}$
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 mg/m^2/day

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.

10.2.1.2 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 10.2.1.1 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/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 Bergerhoff 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.

10.2.1.3 Climate Agreements & Policies

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050'*(3.(1) of No. 46 of 2015). This is referred to in the Act as the 'national transition objective'. The Act provided for the establishment of the Climate Change Advisory Council (hereafter referred to as the Advisory Council) with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations. The Advisory Council is to advise and make recommendations on the following:

- The preparation of a Climate Action Plan (CAP);
- The preparation of a national long term climate action strategy;
- The preparation of a national adaptation framework;
- The finalization and revision of a carbon budget, and

- Compliance with any existing obligations of the State under EU law or any international agreements.

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a) and a third update in December 2022 (Government of Ireland, 2022).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by the publication of the Climate Action and Low Carbon Development (Amendment) Bill 2021 (hereafter referred to as the 2021 Climate Bill) in March 2021. The Climate Act was signed into Law on the 23rd of July 2021, giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act was to provide for the approval of plans 'for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'. The 2021 Climate Act will also 'provide for carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy'. The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the CAP, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Minister for the Environment, Climate and Communications is required to request that each local authority prepare a 'local authority climate action plan' lasting five years and specifying the mitigation measures and the adaptation measures to be adopted by the local authority. The 2021 Climate Act has set a target of a 51% reduction in the total amount of GHGs over the course of the first two carbon periods ending 31 December 2030 relative to 2018 annual emissions. The 2021 Climate Act defines the carbon budget as 'the total amount of GHG emissions that are permitted during the budget period'. The 2021 Climate Act outlined a series of specific actions including:

- To make a strategy to be known as the 'National Long Term Climate Strategy' not less than once in every five-year period with the first to be published for the period 2021 to 2035 and with each subsequent Strategy covering the next three five-year carbon budgets and also include a longer-term perspective of at least 30 years;
- To adopt a system of carbon budgets which will be determined as part of a grouping of three five-year periods calculated on an economy-wide basis, starting with the periods 2021 to 2025, 2026 to 2030, and 2031 to 2035 (See Table 10 2);
- To introduce a requirement for Government to adopt "sectoral emission ceilings" for each relevant sector within the limits of each carbon budget;
- To request all local authorities to prepare CAPs for the purpose of contributing to the national climate objective. These plans should contain mitigation and adaptation measures that the local authority intends to adopt;
- Increasing the power of the Advisory Council to recommend the appropriate climate budget and policies;
- Requiring the Minister to set out a roadmap of actions to include sector specific actions that are required to comply with the carbon budget and sectoral emissions ceiling for the period to which the plan relates; and

- Reporting progress with the CAP on an annual basis with progress including policies, mitigation measures and adaptation measures that have been adopted.

In relation to carbon budgets, the Climate Action and Low Carbon Development (Amendment) Act (Government of Ireland, 2021b) states 'A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')'. The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 10 2. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published July in 2022 and are shown in Table 10 2.

Table 10-2: Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025 (Department of the Taoiseach, 2022)

Sector	Reduction Required	2018 Emissions ($MtCO_2e$) Note 1
2021-2025	295 Mt CO_2eq	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2eq	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2eq	Reduction in emissions of 3.5% per annum for the third provisional budget.

Note 1 Mt CO_2eq denotes million tonnes carbon dioxide equivalent.

Table 10-3: Sectoral Emission Ceiling 2030 (Department of the Taoiseach, 2022)

Sector	Reduction Required	2018 Emissions ($MtCO_2e$)	2030 Emission Ceiling ($MtCO_2e$)
Electricity	75%	10.5	3
Transport	50%	12	6
Buildings (Commercial and Public)	45%	2	1
Buildings (Residential)	40%	7	4
Industry	35%	7	4
Agriculture	25%	23	17.25
Other**	50%	2	1

In December 2022, CAP23 was published (Government of Ireland, 2022). This is the first CAP since the publication of the carbon budgets and sectoral emissions ceilings, and it aims to implement the required changes to achieve a 51% reduction in carbon emissions by 2030. The CAP has six vital high impact sectors where the biggest savings can be made: renewable energy,

energy efficiency of buildings, transport, sustainable farming, sustainable business and change of land-use.

The Dublin City Council Climate Change Action Plan published in 2019 (Dublin City Council and Codema, 2019) outlines a number of goals and plans to prepare for and adapt to climate change. There are five key action areas within the plan: energy and buildings, transport, flood resilience, nature-based solutions and resource management. Some of the measures promoted within the Action Plan under the 5 key areas involve building retrofits, energy master-planning, development of segregated cycle routes, the promotion of bike share schemes, development of flood resilient designs, promotion of the use of green infrastructure and water conservation initiatives. The implementation of these measures will enable the Dublin City Council area to adapt to climate change and will assist in bringing Ireland closer to achieving its climate related targets in future years. New developments need to be cognisant of the Action Plan and incorporate climate friendly designs and measures where possible.

10.2.2 Construction Phase

10.2.2.1 Air Quality

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 demolition, earthworks, construction and haulage 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 considered best practice in the absence of applicable Irish guidance.

Construction phase traffic also has the potential to impact air quality. The Transport Infrastructure Ireland (TII) guidance document *PE-ENV-01106 'Air Quality Assessment of Specified Infrastructure Projects'* (2022), 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. This approach is considered best practice and 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;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

The construction stage traffic has been reviewed against the above criteria to determine whether a detailed air quality assessment is required for the construction phase. It was determined that as the construction stage traffic does not meet any of the above criteria a detailed air quality assessment is not required as there is no potential for significant impacts to air quality from traffic emissions.

10.2.2.2 Climate

The impact of the construction phase of the Proposed Development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the Proposed Development.

10.2.3 Operational Phase

10.2.3.1 Air Quality

Operational phase traffic has the potential to impact air quality. The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2022) and using the methodology outlined in the guidance documents published by TII (2022). This approach is considered best practice and can be applied to any development that causes a change in traffic.

The TII PE-ENV-01106 (2022) scoping criteria outlined in Section 10.2.2.1 was used to determine the road links required for inclusion in the modelling assessment. As none of the road links impacted by the proposed development met the scoping criteria a detailed assessment was scoped out as there is no potential for significant impacts to air quality from traffic emissions.

10.2.3.2 Climate

The impact of the operational phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating operational activities associated with the Proposed Development.

10.3 BASELINE ENVIRONMENT

10.3.1 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 Casement Aerodrome meteorological station, which is located approximately 1.2 km south of the site. Casement Aerodrome met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 10-1). For data collated during five representative years (2017 - 2021), the predominant wind direction is westerly to south-westerly with a mean wind speed of 10.7 m/s over the period 1981 - 2010 (Met Éireann, 2023).

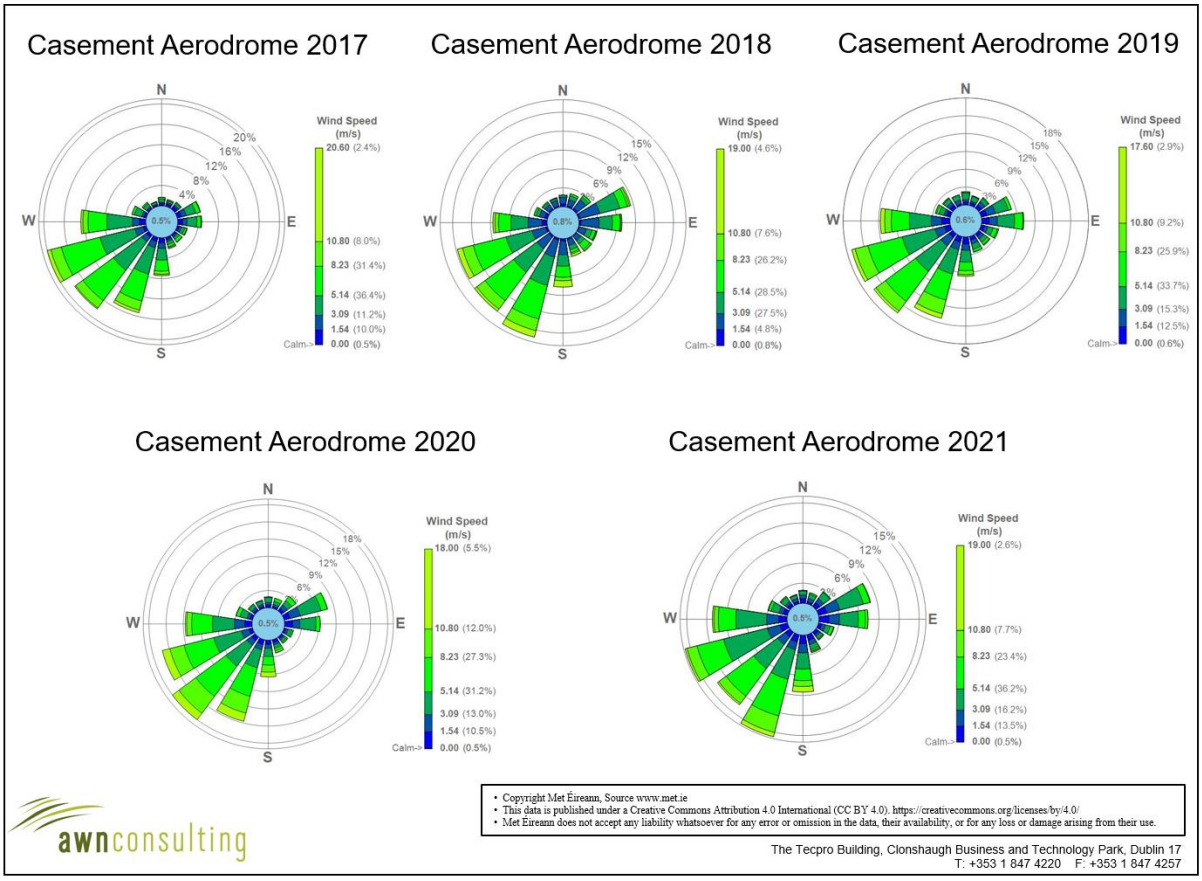

Figure 10-1: Casement Aerodrome Windrose 2017 – 2021 (Met Éireann, 2023)

10.3.2 Background Concentrations of Pollutants

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.

As part of the implementation of the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011), as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2022a). 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 A (EPA, 2022a). 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. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. The EPA *Air*

Quality in Ireland 2021 report details a return to pre-COVID-19 traffic levels where monitoring stations had traffic as a dominant source and as such, is once again can be used to determine baseline levels of pollutants in the vicinity of the proposed development.

PM_{10}

Long-term PM_{10} monitoring was carried out at the suburban Zone A locations of Rathmines, Dún Laoghaire, Tallaght, Phoenix Park and Ballyfermot. Concentrations over the 2017 – 2022 period are below both the annual and daily limit values (EPA, 2022a). The average annual mean concentrations range from 9 – 16 µg/m^3 over the period 2017– 2022 (see Table 10.3). In addition, there were at most 9 exceedances (in Rathmines in 2019) of the daily limit value of 50 µg/m^3, albeit 35 exceedances are permitted per year. Based on the above information an estimated background concentration of 16 µg/m^3 has been used in this assessment.

Table 10-4: Trends In Zone A Air Quality – PM_{10} (µg/m^3)

Station	Averaging Period Note 1	Year				
		2017	2018	2019	2020	2021
Ballyfermot	Annual Mean PM_{10} (µg/m^3)	12	16	14	12	12
	24-hr Mean > 50 µg/m^3 (days)	1	0	7	2	0
Dún Laoghaire	Annual Mean PM_{10} (µg/m^3)	12	13	12	12	11
	24-hr Mean > 50 µg/m^3 (days)	2	0	2	0	0
Tallaght	Annual Mean PM_{10} (µg/m^3)	12	15	12	10	10
	24-hr Mean > 50 µg/m^3 (days)	2	1	3	0	0
Rathmines	Annual Mean PM_{10} (µg/m^3)	13	15	15	11	12
	24-hr Mean > 50 µg/m^3 (days)	5	2	9	2	0

Note 1: Data for 2020 shown for representative purposes only, not used in determining background concentrations.

$PM_{2.5}$

Annual mean concentrations of $PM_{2.5}$ monitoring at the Zone A location of Rathmines over the period 2017 – 2021 (EPA, 2022a) ranged from 8 - 10 µg/m^3 and indicated an average $PM_{2.5}/PM_{10}$ ratio ranging from 0.60 – 0.75. Based on this information, a conservative ratio of 0.8 was used to generate a background $PM_{2.5}$ concentration of 11.2 µg/m^3.

Based on the above information the air quality in the Dublin 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).

10.3.3 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. 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 receptor sensitivity to dust soiling, there are approximately 5 medium sensitivity commercial properties within 100 m of the main works area of the proposed development site. Based on the IAQM criteria outlined in Table 10-5, the worst-case sensitivity of the area to dust soiling is considered to be **low**.

Table 10-5: 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

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.

In terms of receptor sensitivity to human health impacts, the IAQM guidance defines high sensitivity receptors as "*locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day)*" (IAQM, 2014). Examples include residential properties, schools and hospitals. Office and shop workers are considered of medium sensitivity. Low sensitivity receptors are areas where exposure is transient such as public footpaths and shopping streets.

A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 16 µg/m^3 and there are approximately 5 medium sensitivity receptors located within 50 m of the proposed development site. Based on the IAQM criteria outlined in Table 10-6, the worst-case sensitivity of the area to human health is considered to be **low**.

Table 10-6: 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	<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

Ecological sites within 50 m of the proposed development site need to be considered in relation to dust impacts (IAQM, 2014). There are no designated ecological sites within 50m of the boundary of the site and as such the sensitivity of the area to dust related ecological impacts is not applicable.

10.3.4 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details final emissions up to 2019 (EPA, 2022c). The data published in 2021 states that Ireland has exceeded its 2019 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.85 Mt. For 2019, total national greenhouse gas emissions are 59.78 million tonnes carbon dioxide equivalent (Mt CO_2eq) with 45.58 MtCO_2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2019 at 35.3% of the total, with the transport sector accounting for 20.3% of emissions of CO_2.

GHG emissions for 2020 are estimated to be 9.7% lower than those recorded in 2019. Emission reductions have been recorded in 7 of the last 11 years. However, compliance with the annual EU targets has not been met for five years in a row. Emissions from 2016 – 2020 exceeded the annual EU targets by 0.29 MtCO_2eq, 2.94 MtCO_2eq, 5.57 MtCO_2eq, 6.98 MtCO_2eq and 6.73 MtCO_2eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2021 GHG Emissions Projections Report for 2020 – 2040 (EPA, 2021) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2019. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 12.2MtCO_2eq under the "With Existing Measures" scenario and under the "With Additional Measures" scenario (EPA, 2021). The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the 2019 Climate Action Plan and the use of the flexibilities available.

10.4 POTENTIAL IMPACTS

10.4.1 Construction Phase

10.4.1.1 Air Quality

The construction phase has the potential to impact air quality through construction dust emissions. The following determines the potential dust impacts as a result of the proposed development. Section 10.6.1 determines the cumulative construction dust impacts as a result of the overlapping construction phases of the proposed development and other proposed and permitted developments within 350 m of the site.

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 10.3.3). 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 from the construction site onto the public road network by movement of heavy vehicles).

Demolition

There is no scheduled demolition associated with the proposed development and as such has been scoped out of the analysis.

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 > 10,000 m^2, potentially dusty soil type (e.g., clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g., silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes;
- **Small:** Total site area < 2,500 m^2, soil type with large grain size (e.g., sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

Following the IAQM guidance (2014), the proposed earthworks can be classified as 'large'. As a worst case. When combining this with the previously established sensitivity of the area (Section 10.3.3) this results in an overall low risk of dust soiling impacts and a low risk of human health impacts as a result of earthworks activities (see Table 10-7).

Table 10-7: 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

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

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

The dust emission magnitude from construction associated with the proposed works can be classified as 'large', as a worst-case estimate. Therefore, there is an overall low risk of dust soiling impacts and a low risk of human health impacts as a result of the proposed construction activities (Table 10-8).

Table 10-8: 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

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 'large' as worst-case there will be greater than 50 outward HGV movements per day at peak times. As outlined in Table 10-9, combining this with a low sensitivity to dust soiling results in an overall low risk of impacts as a result of the proposed trackout activities in the absence of mitigation. There is an overall low risk of human health impacts as a result of trackout activities as the overall sensitivity of the area to human health impacts is low (Section 10.3.3).

Table 10-9: 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

Summary of Dust Emission Risk

The risk of dust impacts as a result of the proposed development are summarised in Table 10-10 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 low risk of dust impacts as a result of the proposed construction phase. Nevertheless, in order to ensure that no dust nuisance occurs during the earthworks, construction and trackout activities, best practice dust mitigation measures will be implemented. When the dust mitigation measures detailed in the mitigation section of this chapter (Section 10.5) are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors. In the absence of mitigation, there is the potential for short-term, localised, imperceptible dust related impacts to air quality as a result of the proposed development.

Table 10-10: Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low Risk	Low Risk	Low Risk
Human Health	N/A	Low Risk	Low Risk	Low 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 REM assessment criteria in Section 10.2.2.1.

It can therefore be determined that the construction stage traffic will have an imperceptible, direct, neutral and short-term impact on air quality.

Impacts during the decommissioning phase are expected to be of similar type and magnitude to those anticipated during the construction phase, but generally of a shorter duration. During decommissioning an assessment of any changes to receptor sensitivity or dust emission magnitude will be considered.

10.4.1.2 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 section 10.3.3 the surrounding area is of low sensitivity to dust related human health impacts. It was determined that there is an overall low risk of dust related human health impacts as a result of the construction phase of the proposed development. Therefore, in the absence of mitigation there is the potential for imperceptible, direct, neutral, short-term impacts to human health as a result of the proposed development.

10.4.1.3 Sensitive Ecosystems

There are no sensitive ecosystems within 50 m of the proposed development during the construction phase. Therefore, there is no potential for significant impacts to sensitive ecosystems as a result of the proposed development.

10.4.1.4 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, in accordance with the EPA Guidelines, the impact will be short-term, neutral and imperceptible.

10.4.2 Operational Phase

10.4.2.1 Air Quality

There is the potential for a number of emissions to the atmosphere during the operational phase of the development. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO_2, PM_{10} and $PM_{2.5}$.

Traffic flow information provided by the project traffic consultant (see Chapter 15 Traffic and Transportation) obtained from the consulting engineers on this project, was reviewed prior to assessing the impact of the proposed development. It was concluded that further assessment of impacts from the aforementioned pollutant emissions can be screened out using the TII PE-ENV-01106 (2022) guidance.

The proposed development will not increase traffic levels by more than the scoping criteria (see Section 10.2.2.1), therefore, an assessment of the impact of traffic emissions during the operational phase on ambient air quality is not necessary as no significant impacts are likely. The traffic data included the proposed development in addition to other permitted developments in the vicinity of the site where such information was available. It can be concluded that the impact of the proposed development in terms of air quality is long-term, localised, direct, neutral and imperceptible.

10.4.2.2 Human Health

Traffic related air emissions have the potential to impact air quality which can affect human health. The proposed development will not increase traffic levels by more than the scoping criteria (see Section 10.2.2.1), therefore, an assessment of the impact of traffic emissions during the operational phase on human health is not necessary as no significant impacts are likely. Levels of all pollutants are predicted to be below the ambient air quality standards set for the protection of human health (Table 10.1) once the proposed development is operational. It can be determined that the impact to human health during the operational stage is long-term, direct, neutral and imperceptible.

10.4.2.3 Sensitive Ecosystems

Traffic related air emissions have the potential to impact air quality which can affect sensitive ecosystems. The proposed development will not increase traffic levels by more than the scoping criteria (see Section 10.2.2.1), therefore, an assessment of the impact of traffic emissions during the operational phase on sensitive ecosystems is not necessary as no significant impacts are likely.

10.4.2.4 Climate

There are no potential impacts associated with the proposed development during the operational stage as the transmission line will be buried underground. It can be determined that the impact to climate during the operational stage is long-term, neutral and imperceptible.

10.5 MITIGATION MEASURES

10.5.1 Construction Phase

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust mitigation measures. The key aspects of controlling dust are listed below. Full details of the dust mitigation measures can be found in Section 10.10. These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

In summary the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

10.5.2 Operational Phase

There are no mitigation measures proposed for the operational phase of the proposed development.

10.6 CUMULATIVE IMPACTS

10.6.1 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. Permitted and existing

developments under construction within 350m of the site have been reviewed in conjunction with the impacts of the proposed development to determine the potential for cumulative construction dust impacts.

There are a number of developments within 350 m of the site that have the potential for cumulative construction dust impacts to air quality. Should the construction phases of any development coincide with that of the proposed development then there is the potential for cumulative construction dust impacts to nearby receptors.

However, provided the mitigation measures outlined in Section 10.5 are in place for the duration of the construction phase cumulative dust related impacts to nearby sensitive receptors are not predicted to be significant. Cumulative impacts to air quality will be direct, short-term, localised, negative and imperceptible.

Due to the short-term duration of the construction phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered neutral.

10.6.2 Operational Stage

There are no operational emissions from the proposed development, therefore the cumulative impact is predicted to be long-term, neutral and imperceptible in relation to air quality.

10.7 RESIDUAL IMPACTS

10.7.1 Construction Stage

10.7.1.1 Air Quality

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared (Section 10.10). Provided the dust minimisation measures outlined are adhered to, the predicted residual air quality impacts during the construction phase are direct, short-term, negative, localised and imperceptible.

10.7.1.2 Human Health

The measures outlined in Section 10.5 are best practice mitigation measures. They 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 of the proposed development will ensure that the impact complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the predicted residual impact of construction of the proposed development is direct, negative, short-term and imperceptible with respect to human health.

10.7.2 Operational Stage

There are no operational emissions from the proposed development, therefore the impact on air quality, human health and climate is predicted to be long-term, neutral and imperceptible.

10.8 MONITORING

10.8.1 Construction Phase

There is a low risk of dust soiling and as such monitoring of construction dust deposition is not recommended. Once the mitigation measures outlined in Section 10.5 are implemented impacts are predicted to be imperceptible.

10.8.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

10.9 INTERACTIONS

An adverse impact due to air quality in either the construction or operational phase has the potential to cause human health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact complies with all ambient air quality legislative limits and, therefore, that the predicted residual impact is short-term, negative and imperceptible during the construction phase, and long-term, neutral and imperceptible during the operational phase.

Interactions between air quality and traffic 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 AADT on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality during both construction and operational phases, are considered to be imperceptible.

With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interaction between air quality and land and soils.

10.10 SCHEDULE OF ENVIRONMENTAL COMMITMENTS

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 management plan has been formulated by drawing on best practice guidance from Ireland, the UK (BRE, 2003; IAQM, 2014; The Scottish Office, 1996; UK ODPM, 2002) and the USA (USEPA, 1997).

Site Management

The aim is to ensure good site management by avoiding dust 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 (See Section 10.3.3) and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 10.1 for the windrose for Casement Aerodrome). 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 where 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 the 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.
- 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.
- 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 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 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.

10.11 REFERENCES

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