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12 Air Quality & Climate

12.1 Introduction

Irwin Carr Consulting has been instructed by Platinum Land Halley to undertake an air quality and climate impact assessment in relation to a proposed mixed-use development at the previous Chivers Site, Coolock, Dublin.

The site is bounded by Greencastle Road to the north, Coolock Drive to the east and Oscar Traynor Road to the south.

This chapter of the Environmental Impact Assessment Report (EIAR) considered the potential short-term impacts associated with dust from the construction (including demolition phase). Predicted impacts associated with traffic related pollutants namely, nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM10) are presented as are climate change impacts. Mitigation measures are described as required.

Irwin Carr Consulting is an indigenous company based in Ireland. The company has a proven track record in air quality impact assessments throughout the UK and Ireland, with extensive knowledge of the issues in relation to air quality impacting upon residential developments.

This chapter was prepared by Dr Chris Jordan. Chris is a Director in Irwin Carr Consulting with primary responsibilities for assessing environmental noise and air quality. He has more than 15 years' experience of working in the field of air quality, having previously worked in both the public and private sectors after obtaining a BSc (Hons) Degree in Environmental Health – 1st Class. Chris has been responsible for undertaking and reviewing air quality impact assessments on numerous large-scale residential developments throughout the Ireland.

12.2 Air Quality Standards

The European Union (EU) has introduced several measures to address the issue of air quality management, since the initial Framework Directive on ambient air quality assessment and management (Council Directive 96/62/EC). The aim is to protect human health and ecosystems from negative impacts. The current guidelines are the Clean Air for Europe (CAFÉ) Directive (2008/50/EC) which replaced the previous Air Framework Directive (1996/30/EC) and its daughter directives. The air quality standards currently applicable in Ireland are the EU ambient standards, which are presented in **Table 12.1** below. These limits were transposed into Irish law by the S.I. No.180 of 2011, Air Quality Standards (AQS) Regulations 2011:

Pollutant	Directive / Regulation	Limit Type	Value
Nitrogen Dioxide	2008/50/EC and SI180 of 2011	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3 NO_2
		Annual limit for protection of human health	40 µg/m^3 NO_2
		Annual limit for protection of vegetation	30 µg/m^3 NO + NO_2
Sulphur dioxide	2008/50/EC and SI180 of 2011	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350 µg/m^3
		Daily limit for protection of human health - not to be exceeded more than 3 times/year	125 µg/m^3
		Annual Mean	60 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC and SI180 of 2011	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	30 µg/m^3 PM_{10}
$PM_{2.5}$	2008/50/EC and SI180 of 2011	Annual limit for protection of human health	25 µg/m^3 $PM_{2.5}$
Benzene	2008/50/EC and SI180 of 2011	Annual limit for protection of human health	5 µg/m^3
Carbon Monoxide	2008/50/EC and SI180 of 2011	8-hour limit (on a rolling basis) for protection of human health	10 mg/m^3

TABLE 12.1 IRISH AIR QUALITY STANDARDS

The standards for air pollution set out above are concentrations over a given time period that are considered to be acceptable in the light of what is scientifically known about the effects of each pollutant on health and on the environment. They can also be used as a benchmark to determine if air pollution is getting better or worse.

An exceedance of a standard is a period of time (which is defined in each standard) where the concentration is higher than that set down by the standard. In order to make useful comparisons between pollutants, for which the standard may be expressed in terms of different averaging times, the number of days on which an exceedance has been recorded is often reported.

An objective is the target date on which exceedances of a standard must not exceed a specified number.

12.2.1 Dust

There are no national or EU limits for dust deposition. However, the TA Luft Technical Instructions on Air Quality (TA Luft, 2002) provide a guideline for the rate of dust deposition of 350 mg/m2/day averaged over one year.

12.2.2 Climate

The Climate Action and Low Carbon Development Act 2015 sets out the national objective of transitioning to a low carbon, climate resilient and environmentally sustainable economy in the period up to 2050. The Act provides for the preparation of a yearly National Mitigation Plan which will specify policies to reduce greenhouse gas emissions for each sector, including transport.

12.3 Methodology

Based on the proposed development, there are three main elements of this assessment:

- The impact of the construction phase on the surrounding area;
- The impact the surrounding road network will have on the proposed and existing residential dwellings from both the existing and proposed increase in traffic flows; and
- The impact of the proposed development on climate.

12.3.1 Construction Phase Assessment

It should be noted that the assessment of construction phase impacts also includes proposed demolition works.

The Institute of Air Quality Management (IAQM) – 'Guidance on the Assessment of dust from demolition and construction' Version 1.1 2014, provides a structured approach to assessing potential dust impacts from construction activities.

There are two types of receptors that may be impacted by dust generated during construction activities;

i. A 'human receptor', refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling or exposure to PM_{10}; and,

ii. An 'ecological receptor' refers to any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats)

The assessment methodology considers three separate dust impacts, with account being taken of the sensitivity of the area that may experience these effects;

i. annoyance due to dust soiling;
ii. the risk of health effects due to an increase in exposure to PM_{10}; and,
iii. harm to ecological receptors.

The IAQM Guidance provides a 4-step approach to the assessment of dust impacts;

Step 1 requires screening of the proposed development in terms of the distance of sensitive receptors (human and ecological) from the proposed works. No further assessment is required where receptors are not identified within a defined distance from the works.

Step 2 requires an assessment of dust impacts, this is done separately for each of the four identified activities (demolition, earthworks, construction and trackout) and take account of the scale and nature of the works which determines the potential dust emission magnitude (2A) and the sensitivity of the area (2B). These are then combined to provide the risk of dust impacts (2C).

Risks are described in terms of there being a low, medium or high risk of dust impacts for each of the four separate potential activities. Where there are low, medium or high risks of an impact, then site-specific mitigation will be required, proportionate to the level of risk.

Based on the threshold criteria and professional judgement one or more of the groups of activities may be assigned a 'negligible' risk. Such cases could arise, for example, because the scale is very small and there are no receptors near to the activity.

Step 3 requires a determination of the site-specific mitigation for each of the four potential activities in Step 2.

Step 4 examines the residual effects following the application of mitigation.

12.3.2 Operational Phase Assessment

While there is no specific Irish guidance in relation to the methodology for carrying out Air Quality Assessments which require detailed modelling, guidance is provided by the Transport Infrastructure Ireland (TII), *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (TII, 2011), but for the detailed assessment and limit levels the TII guidance references the UK guidance as an appropriate methodology to be followed.

In our assessment we have relied upon the methodology provided by the TII for the source of background data, appropriate modelling software and followed the UK Highways Agency and the Department for Environment, Food, and Rural Affairs (DEFRA) guidance as an appropriate reference methodology for assessing the impact of new road developments associated with this proposed mixed-use development.

12.3.2.1 ADMS Roads Modelling Software

ADMS Roads pollution model is a comprehensive tool for investigating potential air quality impacts from road networks, for instance changes in traffic flow, new lanes or new roads.

Five years of hourly sequential meteorological data (Dublin Airport, 2013- 2017) was used for the AERMOD dispersion modelling assessment. This allowed for the determination of the predicted overall average impact of emissions from the facility. The windrose data for each individual year is presented in **Figure 12.1** below.

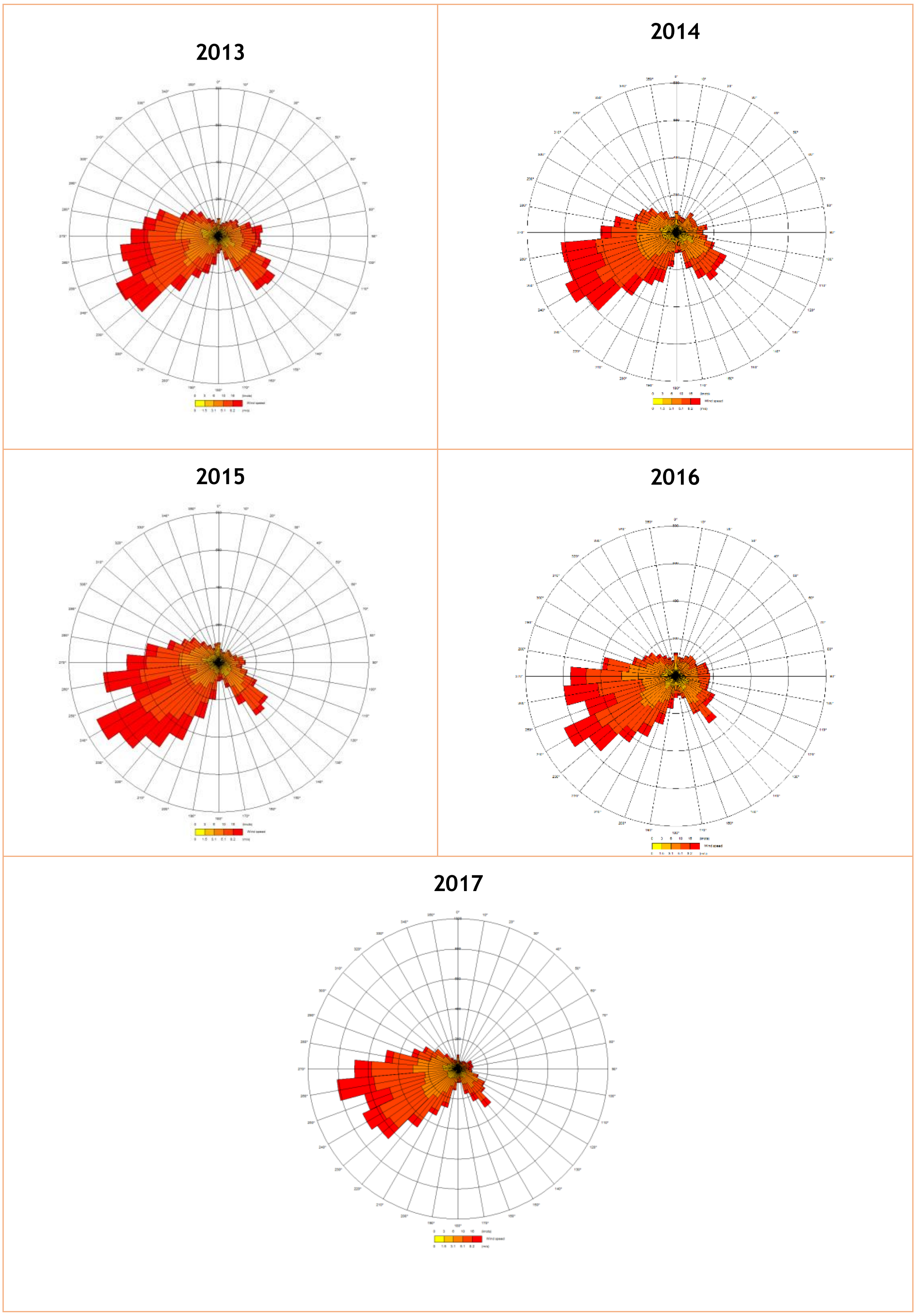

FIGURE 12.1 ANNUAL WINDROSE DATA

The ADMS Roads pollution model predicts pollutant concentrations at receptor locations near to roads. It can be used to predict annual mean concentrations of nitrogen oxides (NO_x) and particulate matter (PM_{10} and $PM_{2.5}$). The ADMS Roads pollution model requires input data on annual average daily traffic flow (AADT), annual average speeds, the proportion of different vehicle types, the type of road, and the grid coordinates of receptors. ADMS Roads pollution model is widely utilised across central government, local government and environmental consultancies.

Recent evidence shows that the proportion of primary NO_2 in vehicle exhaust has increased. This means that the relationship between NO_x and NO_2 at the roadside has to be accounted for in the model outputs. Consequently, Department of Environment Food and Rural Affairs (DEFRA) in the UK has published a NO_x to NO_2 calculator (v4.1 June 2014) to permit such a conversion. The calculator applies to all road types and can also be used to estimate roadside NO_x from roadside NO_2 measurements.

The UK Highways Agency has indicated that the prediction models may significantly under-predict concentrations of nitrogen dioxide alongside urban city-centre roads classified as "street canyons". In this context, a street canyon may be defined as a relatively narrow street with buildings on both sides, where the height of the buildings is generally greater than the width of the road. To avoid missing potential exceedances of the objective in such locations, corrective guidance has been provided to account for street canyon effects. It has been decided that on review of the streetscapes in proximity to the proposed development that a street canyon effect is unlikely to occur as neighbouring buildings are not greater in height that the width of the road.

DEFRA in the UK has stated that if the annual mean objectives are not exceeded, it may be confidently assumed that the short-term (1-hour) objectives will also be met. However, if this approach is used, then care must be taken to include relevant locations where the hourly objectives might apply. If the annual mean nitrogen dioxide concentration is greater than 60 µg m3, then there is a risk that the 1-hour objective may also be exceeded.

The ADMS Roads assessment is based upon traffic flows provided in the Traffic Chapter including annual average daily traffic (AADT) and percentage HGVs. Irwin Carr Consulting has relied upon 2037 AADT flows (assumed 15 years of opening of the proposed Phase 1 mixed-use development), without and with the mixed-use development in operation. The AADT flows used in the ADMS Roads assessment are presented in **Table 12.2**.

Road Name	Annual Average Daily Traffic Flows
Coolock Drive	2037 Peak flows without development = 794 2037 Peak flows with development = 886
Oscar Traynor Road	2037 Peak flows without development = 1537 2037 Peak flows with development = 1629
Greencastle Road	2037 Peak flows without development = 915 2037 Peak flows with development = 1007

Table 12.2 AADT Flows Used In The ADMS Roads Assessment

The use of background pollutant concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants within the vicinity of the study site include industrial, domestic and rail emissions.

The rationale for describing the impact of the proposed development is derived from the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance "Land-Use Planning & Development Control: Planning for Air Quality", May 2015.

12.4 Proposed Development

The proposal consists of the demolition of existing buildings and redeveloping it for 495 Build to Rent residential units, which are proposed to be split into 4 no. proposed blocks (Blocks A1, A2 each with two 10 storey elements, and Blocks B & C ranging from 3no. to 7no. storeys and associated residential services and facilities, as well as courtyard spaces. In addition, the scheme includes for a service building comprising of a crèche (300 sq. m), café (34 sq. m) and gym (412 sq. m), as well as streets, public realm amenity and green open space.

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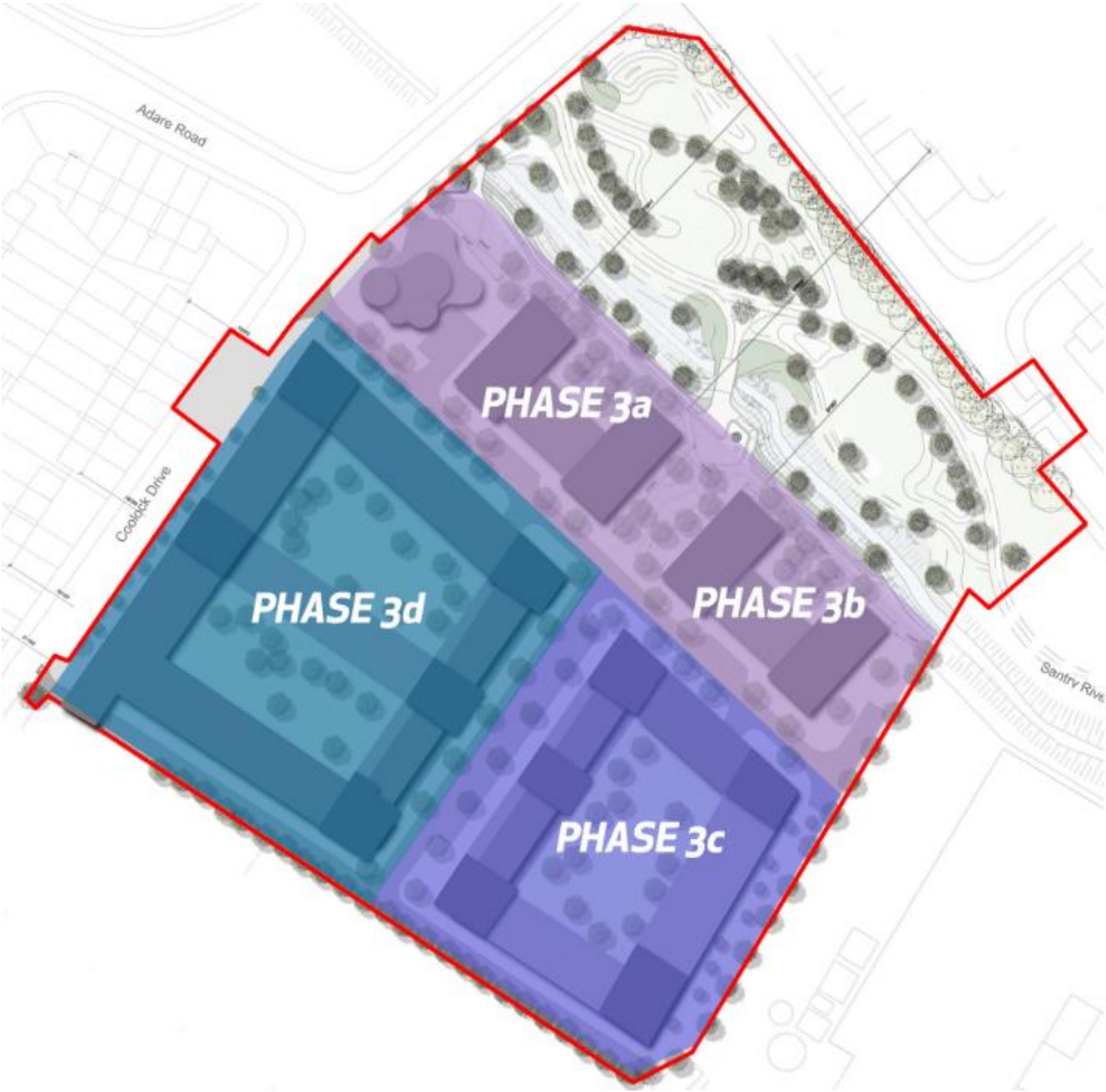

FIGURE 12.2 PROPOSED SITE LAYOUT

12.5 Receiving Environment

The nearest human sensitive receptors considered as part of this air quality impact assessment are the indicative dwellings (R1-R5) proposed as part of the mixed used development and the closest existing dwellings (ER1-ER3) at a distance of approximately 30m from the application area along the Western edge of the Coolock Drive, as presented in **Table 12.3 and Figure 12.2**.

Receptor Location (Nearest Road)	Location (Irish Grid Reference)
R1- A1 - North East	319735,239742
R2 - A1 - North West	319700,239756
R3 - A1 - South East	319753,239705
R4 - A1 - South West	319717,239720
R5 - A2 - North East	319793,239690
R6 - A2 - North West	319756,239702
R7 - A2 - South East	319807,239649
R8 - A2 - South West	319772,239667
R9 - B - North East	319764,239658
R10 - B - North West	319717,239639
R11 - B - South East	319772,239602
R12 - B - South West	319720,239585
R13 - C - North East	319659,239670
R14 - C - North West	319613,239679
R15 - C - South West	319638,239637
R16 - C- South East	319682,239629
R17 - D - North East	319695,239723
R18 - D - North West	319613,239679
R19 - D - South East	319682,239629
R20 - D - South West	319638,239637

TABLE 12.3 SENSITIVE RECEPTORS – PROPOSED

Receptor Location (Nearest Road)	Location (Irish Grid Reference)
R21 - Coolock Drive	319618,239729
R22 – Coolock Drive	319515,239579
R23 – Beechlawn Green	319424,239436
R24 – Oscar Traynor Road	319848,239226
R25 – Greencastle Road	319862,239723
R26 – Greencastle Road	319779,239845

TABLE 12.3 SENSITIVE RECEPTORS – PROPOSED

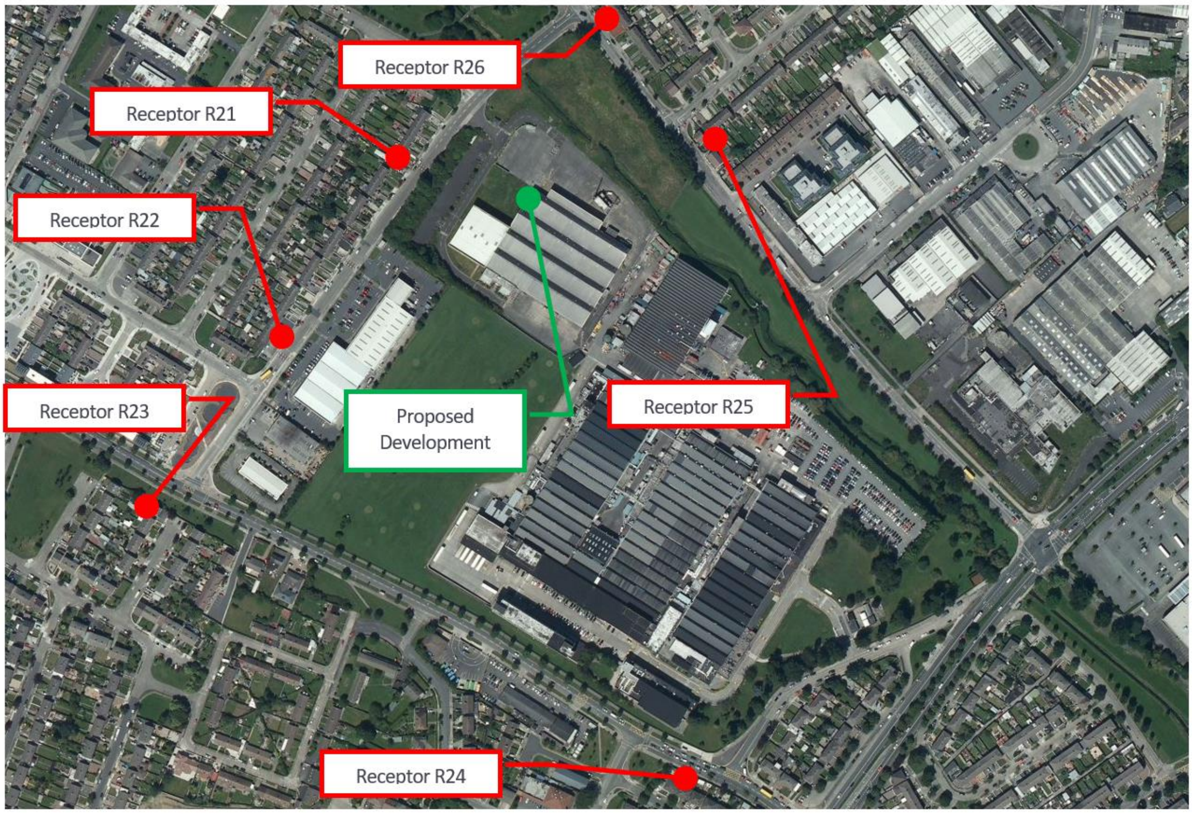

FIGURE 12.3 LOCATION OF SENSITIVE RECEPTORS

The Air Framework Directive deals with each EU member state in terms of "Zones" and "Agglomerations". These air quality zones have been declared for air quality management and assessment purposes. As part of the EU Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined for Ireland.

i. Zone A: Dublin Conurbation

ii. Zone B: Cork Conurbation

iii. Zone C: Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise

iv. Zone D: Rural Ireland, i.e. the remainder of the country excluding Zones A, B and C

The subject site is in Zone A, the Dublin Conurbation. Background sources of pollutants within the vicinity of the study site include industrial, domestic and rail emissions.

EPA mobile and fixed monitoring units monitor air quality at locations within Zone A. The typical baseline air quality data outlined below in **Table 12.4** is based on a review of the Air Quality Monitoring Report 2015 (EPA, 2016).

Pollutant	Zone A Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2015	Relevant Limit Value
PM_{10}	Winetavern Street	14 µg/m^3	PM_{10} annual mean limit for the protection of human health = 40 µg/m^3
	Rathmines	15 µg/m^3	
	Phoenix Park	12 µg/m^3	
	Blanchardstown	17 µg/m^3	
	Dun Laoghaire	13 µg/m^3	
	Ballyfermot	12 µg/m^3	
	Davitt Road	13 µg/m^3	
	St Anne's Park	**15 µg/m^3**	
	Tallaght	14 µg/m^3	
	Average	**13.9 µg/m^3**	
SO_2	Winetavern Street	1 µg/m^3	SO_2 annual mean limit for the protection of vegetation= 20 µg/m^3
	Coleraine Street	0.1 µg/m^3	
	Rathmines	2 µg/m^3	
	Tallaght	3 µg/m^3	
	Average	**1.5 µg/m^3**	
NO_2	Winetavern Street	31 µg/m^3	NO_2 annual mean limit for the protection of human health = 40 µg/m^3
	Coleraine Street	25 µg/m^3	
	Rathmines	18 µg/m^3	
	Dun Laoghaire	16 µg/m^3	
	Ballyfermot	16 µg/m^3	
	Blanchardstown	25 µg/m^3	
	St Anne's Park	**14 µg/m^3**	
	Swords	13 µg/m^3	
	Average	**19.8 µg/m^3**	
NO_x	Winetavern Street	49 µg/m^3	NO_x annual mean limit for the protection of human health = 30 µg/m^3
	Coleraine Street	44 µg/m^3	
	Rathmines	28 µg/m^3	
	Dun Laoghaire	27 µg/m^3	
	Ballyfermot	23 µg/m^3	
	Blanchardstown	55 µg/m^3	
	St Anne's Park	**21 µg/m^3**	
	Swords	22 µg/m^3	
	Average	**33.6 µg/m^3**	

Pollutant	Zone A Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2015	Relevant Limit Value
Carbon Monoxide	Winetavern Street	0.0 mg/m^3	CO maximum daily 8 – hour mean value = 10 mg/m^3
	Coleraine Street	0.4 mg/m^3	
	Average	**0.2 mg/m^3**	

TABLE 12.4 AIR QUALITY MONITORING DATA REPRESENTATIVE OF EPA ZONE A MONITORING SITES

The closest monitoring station to the site is St Anne's Park, where continuous monitoring is undertaken for Nitrogen Dioxide and Particulate Matter (PM10). As can be seen from the information presented above, the annual mean concentrations for both parameters is well below the relevant limit value for the protection of human health and vegetation.

A review of other Zone A monitoring stations in Dublin demonstrates that for all pollutants excluding NOx, the average annual mean is well below the individual limit value.

The annual average mean for NOx is in excess of the relevant limit value and is associated with inter alia transportation emissions.

The background concentrations utilised within the ADMS modelling represents an average of the above values (unless measurements have been specifically undertaken in the St Anne's Park area i.e. (NO_2 and PM10) as these better represent the setting in proximity to the proposed development.

According to the EPA (2018) Ireland is not projected to meet 2020 emissions reduction targets and is not on the right trajectory to meet longer term EU and national emission reduction commitments. The SEAI reported that transport accounted for the largest share of energy-related CO2 emissions, with a share of 37% in 2016, up from 33% in 2005. The residential sector accounted for the second largest share in that year, at 25%. The State thus faces significant challenges in meeting emission reduction targets for 2020 and beyond. Greater effort is required to position Ireland on a pathway towards a low carbon and climate resilient State, in line with the national objective of the Climate Action and Low Carbon Development Act, 2015.

12.6 Impact Assessment – Construction Phase

12.6.1 Climate

Construction traffic would be expected to be the dominant source of greenhouse gas emissions as a result of the development. Vehicles will give rise to CO_2 and NO_2 emissions during construction of the proposed development.

The main construction works will take place over approximately a 36-month period within which the majority of truck movements will occur. This covers the enabling works, demolition, excavation and construction phases.

Within this period there will be some activities such as excavation for the building which will produce the greatest number of HGV movements in and out of the site. This will only occur over a short period of time (3 months) within this 36-month period.

During this peak trip generation phase the key traffic flows per day are as follows:

- 2-way HGV movements per day: 84; and
- 2-way cars / site operative movements per day: 20.

The construction phase will generate 100 site operatives. It has been assumed that 25% of staff will access the site via public transport. The remainder will comprise of site operatives travelling to and from the site via car and van. It has been assumed that vehicle occupancy for the construction staff is typically 2 persons per vehicle.

During the construction phase the key traffic flows per day are as follows:

- 2-way HGV movements per day: 30; and
- 2-way cars / site operative movements per day: 76

Based on the small number of construction vehicles and equipment to be used during construction and the short duration of the construction period, the potential impact on climate from the proposed development is deemed to be negligible.

The impact of climate due to the construction phase of the Proposed Project will not be significant.

12.6.2 Dust

Emissions of dust to air can occur during the preparation of the land (e.g. demolition, land clearing, and earth moving), and during construction. Emissions can vary substantially from day to day, depending on the level of activity, the specific operations being undertaken, and the weather conditions. The scale of these impacts depends on the dust suppression and other mitigation measures applied

The impacts depend on the mitigation measures adopted. Therefore, the emphasis in the guidance is on classifying the risk of dust impacts from a site, which will then allow mitigation measures commensurate with that risk to be identified. It is anticipated that with the implementation of effective site-specific mitigation measures the environmental effect will not be significant in most cases. Nonetheless a robust assessment of the dust impact risk is necessary in order to determine the level of site-specific mitigation that should be applied.

The potential air quality and climate impacts that may arise during demolition and construction activities are:

- dust deposition, resulting in the soiling of surfaces;
- visible dust plumes, which are evidence of dust emissions;
- elevated PM_{10} concentrations, as a result of dust generating activities on site; and
- an increase in concentrations of airborne particles and nitrogen dioxide due to exhaust emissions from diesel powered vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.

The most common impacts are dust soiling and increased ambient PM_{10} concentrations due to dust arising from activities on the site. Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed.

The risk of dust emissions from a demolition/construction site causing loss of amenity is related to:

- the activities being undertaken (demolition, number of vehicles and plant etc.);
- the duration of these activities;
- the size of the site;
- the meteorological conditions (wind speed, direction and rainfall);
- the proximity of receptors to the activities;

- the adequacy of the mitigation measures applied to reduce or eliminate dust; and
- the sensitivity of the receptors to dust.

Adverse impacts can occur in any direction from a site. They are, however, more likely to occur downwind of the prevailing wind direction and/or close to the site. It should be noted that the 'prevailing' wind direction is usually the most frequent direction over a long period such as a year (in the case of Ireland South Westerly); whereas construction activity may occur over a period of weeks or months during which the most frequent wind direction might be quite different. The most frequent wind direction may also not be the direction from which the wind speeds are highest. The use of the prevailing wind direction in the assessment of risk is most useful, therefore, for construction projects of long duration such as this.

Dust impacts are more likely to occur during drier periods, as rainfall acts as a natural dust suppressant.

As described Section 12.2 above, the IAQM Guidance provides a 4-step approach to the assessment of dust impacts and this methodology is followed below.

Step 1

An assessment will normally be required where there is a human receptor within 350m of the boundary of the site; or 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance.

The nearest residential dwelling to the application area is approximately 30m to the east and thus further assessment is required.

Step 2

The criteria for assessing the risk of dust impact is provided in **Table 12.5**, with the potential magnitude of dust presented in **Table 12.6**.

Stage of Works	Scale	Comment
Demolition	Large	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level
	Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level
	Small	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	Large	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes

	Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes
	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.
Construction	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).
Trackout	Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
	Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100m
	Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

TABLE 12.5 CRITERIA FOR ASSESSMENT OF RISK FROM DUST

Based on the proposed plans provided by the Design Team which include the proposed demolition of all existing buildings on the site, the magnitude of dust emissions during the construction phase is set out in the Table below.

Activity	Dust Emission Magnitude
Demolition	Medium
Earthworks	Medium
Construction	Medium
Trackout	Medium

TABLE 12.6 DUST EMISSION MAGNITUDE DURING CONSTRUCTION PHASE

It is determined that for all stages of the construction of the proposed development the potential dust magnitude is considered to be medium.

The **Table 12.7** below sets out the criteria for assessing people's sensitivity to dust in the vicinity of the site.

Sensitivity Level	Comment
High	Users can reasonably expect enjoyment of a high level of amenity; or The appearance, aesthetics or value of their property would be diminished by soiling; and The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Indicative examples include dwellings, museums, and other culturally important collections, medium and long-term car parks and car showrooms.
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or The appearance, aesthetics or value of their property could be diminished by soiling; or The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land, Indicative examples include parks and places of work.
Low	The enjoyment of amenity would not reasonably be expected, or Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Indicative examples include laying fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads.

TABLE 12.7 CRITERIA FOR ASSESSING DUST SENSITIVITY

The closest existing sensitive human receptors are the 3No. residential dwellings located c.30m east of the application area, based on the criteria set out in the IAQM and reproduced in the **Table 12.8** below, the sensitivity of these receptors is determined to be low.

Receptor Sensitivity	Number of receptors	Distance from the 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

TABLE 12.8 SENSITIVITY OF PEOPLE TO DUST SOILING EFFECTS

The **Table 12.9** below sets out the sensitivities of people in the vicinity of the application area to the health effects of PM_{10}.

Sensitivity of Receptor	Comment
High	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 a day). Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.
Medium	Locations where the people exposed are workers, and exposure is 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). Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.
Low	Locations where human exposure is transient Indicative examples include public footpaths, playing fields, parks and shopping streets.

TABLE 12.9 CRITERIA FOR ASSESSING HEALTH EFFECTS

The recorded annual mean PM_{10} at the EPA Tallaght Monitoring Station in 2015 was 14 µg m^3 significantly below the annual mean limit for the protection of health which is 14 µg m^3. Based on the distance from the source i.e. 30m at the closest point combined with the low background annual mean, the sensitivity of people to the health effects of PM_{10} is deemed to be low for all dust generating activities.

Receptor Sensitivity	Annual Mean PM_{10} concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32 µg m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 – 28 µg m^{-3}	>100	High	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<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	>32 µg m^{-3}	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28 - 32 µg m^{-3}	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24 – 28 µg m^{-3}	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg m^{-3}	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

TABLE 12.10 SENSITIVITY OF PEOPLE TO THE HEALTH EFFECTS OF PM_{10}

Chapter 10, Biodiversity, identifies that there are no designated conservation sites (SACs, SPAs or pNHAs) within one kilometre of the proposed development site. The closest Natura 2000 site is Glenasmole Valley SAC at 3.3km and the nearest SPA is the Wicklow Mountains SPA at 7.5km. There is no direct hydrological link to any European Designated sites. The site is an urban/industrial area surrounded by roads and buildings with no intact biodiversity corridors to Natura 2000 or other conservation sites. The sensitivity of ecological receptors to dust generating activities is thus determined to be low as set out in the Tables below.

Sensitivities of receptors to ecological effects

Sensitivity of Receptor	Comment
High	Locations with an international or national designation and the designated features may be affected by dust soiling; or Locations where there is a community of a particular dust sensitive species such as vascular species included in the Red Data List for Great Britain

Sensitivity of Receptor	Comment
	Indicative examples included a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or Locations with a national designation where the features may be affected by dust deposition. Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features
Low	Locations with a local designation where the features may be affected by dust deposition Indicative example is a local Nature Reserve with dust sensitive features

TABLE 12.11 CRITERIA FOR ASSESSING ECOLOGICAL EFFECTS

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

TABLE 12.12 SENSITIVITY OF RECEPTORS TO ECOLOGICAL EFFECTS

The Table below provides a summary of the conclusions from the dust assessment.

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

TABLE 12.13 SENSITIVITY OF THE SURROUNDING AREA DURING THE CONSTRUCTION PHASE

Step 2C of the IAQM Guidance requires that following the determination of the sensitivity of the surrounding area, the risk of impacts in the absence of mitigation measures be defined for each stage of the construction works phase. **Tables 12.14 to 12.17** are reproduced from the Guidance.

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

TABLE 12.14 RISK OF DUST IMPACTS WITH NO MITIGATION – DEMOLITION

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

TABLE 12.15 RISK OF DUST IMPACTS WITH NO MITIGATION – 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

TABLE 12.16 RISK OF DUST IMPACTS WITH NO MITIGATION – CONSTRUCTION

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

TABLE 12.17 RISK OF DUST IMPACTS WITH NO MITIGATION – TRACKOUT

Applying the results of **Tables 12.12 (Medium) and 12.13 (Low)**, it is determined that in the absence of mitigation the risk to both human and ecological receptors during the construction phase is 'Low Risk'.

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Low Risk	Low Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk
Ecological	Low Risk	Low Risk	Low Risk	Low Risk

TABLE 12.18 SUMMARY OF DUST RISK TO DEFINE SITE SPECIFIC MITIGATION

12.7 Impact Assessment – Operational Phase

12.7.1 Climate

It is anticipated that development of the site will promote a modal shift due to its location in close proximity to a range of public transport, including;

- The Harmanstown DART Station is within 1.9km of the site
- Route 43 bus service pass close to the site, travelling along the Malahide Road between Swords Business Park and Talbot Street and the proposed pedestrian access through the site onto Greencastle Road will result in a 650 metre walk for residents to the nearest Malahide QBC bus stop
- At present, the cycle network consists of a cycle lane along the Malahide QBC. This link provides a cycle link along the Malahide Road and Fairview Road into the city centre for a distance of 6 km.
- Good quality pedestrian infrastructure on adjacent links and through the proposed development linking to key destinations locally within a short walking distance;

This anticipated modal shift will be beneficial in terms of greenhouse gas emissions associated with road traffic emissions within the study area.

Energy efficient measures are incorporated into the scheme's design. The scheme is Part L compliant and an important element of Part L is the requirement for onsite or nearby renewables to meet the energy demand.

It is also planned to provide the necessary infrastructure within the development to connect to the proposed 'Heatnet' District Heating Scheme being developed by South Dublin County Council in Tallaght.

Improvements in energy efficiency coupled with the increased use of renewable energy technologies constitute important measures needed to facilitate a reduction in Ireland's energy dependency on fossil fuels and associated greenhouse gas emissions over the period to 2020 and beyond.

12.7.2 Traffic Pollutants

The rationale for describing the impact of the proposed development is derived from the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance "Land-Use Planning & Development Control: Planning for Air Quality" May 2015.

There is a two-stage process to be followed in the assessment of air quality impacts:

i. A qualitative or quantitative description of the impacts on local air quality arising from the development; and

ii. A judgement on the overall significance of the effects of any impacts

The suggested framework for describing the impacts is set out in Table 6.3 of the EPUK & IAQM guidance document and replicated in **Table 12.19 below**. The term Air Quality Assessment Level (AQAL) has been adopted as it covers all pollutants, i.e. those with and without formal standards. AQAL is used to include air quality objectives or limit values where these exist. The Environment Agency uses a threshold criterion of 10% of the short term AQAL as a screening criterion for the maximum short-term impact. The EPUK & IAQM guidance adopts this as a basis for defining an impact that is sufficiently small in magnitude to be regarded as having an insignificant effect.

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	<1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

TABLE 12.19 AQAL IMPACT DESCRIPTORS FOR INDIVIDUAL RECEPTORS

Explanation:

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

2. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as Negligible.

3. The Table is only designed to be used with annual mean concentrations.

4. Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.

5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.

6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

The rationale for the assessment of significance is derived from the EPUK & IAQM Guidance as referenced in **Table 12.19** above.

Impacts on air quality, whether adverse or beneficial, will have an effect on human health that can be judged as 'significant' or 'not significant'. It is important to distinguish between the meaning of 'impact' and 'effect'.

An 'impact' is the change in the concentration or deposition rate of an air pollutant, as experienced by a receptor. This may have an 'effect' on the health of a human receptor, depending on the severity of the impact and other factors that may need to be taken into account.

The impact descriptors set out in **Table 12.19** are not, in themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

Any judgement on the overall significance of effect of a development will need to take into account such factors as:

- The existing and future air quality in the absence of the development
- The extent of current and future population exposure to the impacts; and,
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts

The presence of an AQMA that may be affected by a proposed development will increase the sensitivity of the application and any accompanying assessment. In this case, the proposed development site is not located within the Dublin Regional Air Quality Management Plan Air Quality Management Areas. The impacts descriptor acknowledges this and points to a conclusion of significant effect in cases where concentrations of a regulated pollutant are in excess of the objective value. Where the baseline concentrations are close to the objective value at a receptor, but not exceeding it, a case may be made for the development's predicted contribution being significant. It will always be difficult, however, to attribute the exceedance of an objective to any individual source.

Magnitude (scale of change) is determined by considering the predicted deviation from baseline conditions. Quantifiable assessment of magnitude has been undertaken. Impacts of the proposed development on air quality have been assessed with reference to the baseline conditions and environmental assessment criteria.

The predicted pollutant concentrations at proposed (R1 – R20) and existing residential dwellings (R21 – R26) in proximity to the existing road network, with and without the proposed development in operation, are summarised in Tables 12.21 and 12.22. This is based on the assumptions that the peak flows for the assumed future year of 2034 are as outlined in Table 12.1.

It should be highlighted that the background concentrations relate to current day and given that emissions reduce in time due to improvements in the emissions profile of the national fleet of vehicles, reliance on the current day background concentrations would be deemed conservative in representing to 2035 traffic flow predictions. **Appendix 12.1** includes a detailed breakdown of the results per individual meteorological year. **Appendix 12.2** includes a graphical representation of the 2035 predictions based on the 2017 meteorological year.

Receptor Name	Assessed Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_2	PM_{10}	CO
		Annual mean µg m^{-3}	Annual mean µg m^{-3}	8-hour mean µg m^{-3}
Without Development	2034			
R1		1.36	0.23	0.01
R2		2.20	0.37	0.01
R3		1.04	0.18	0.01
R4		1.25	0.21	0.01
R5		1.06	0.18	0.01
R6		1.02	0.17	0.01
R7		0.89	0.15	0.00
R8		0.88	0.15	0.00
R9		0.84	0.14	0.00
R10		0.85	0.14	0.00
R11		0.73	0.12	0.00
R12		0.77	0.13	0.00
R13		1.49	0.25	0.01
R14		10.38	1.76	0.06
R15		1.43	0.24	0.01
R16		0.95	0.16	0.01
R17		1.56	0.26	0.01
R18		10.40	1.76	0.06
R19		0.95	0.16	0.01
R20		1.44	0.24	0.01
R21		2.01	0.34	0.01
R22		2.57	0.44	0.01
R23		2.67	0.45	0.01

Receptor Name	Assessed Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_2	PM_{10}	CO
		Annual mean µg m^{-3}	Annual mean µg m^{-3}	8-hour mean µg m^{-3}
R24		3.11	0.53	0.02
R25		7.44	1.26	0.04
R26		4.23	0.72	0.02
With Development	2034			
R1		1.34	0.23	0.01
R2		2.23	0.38	0.01
R3		1.01	0.17	0.01
R4		1.24	0.21	0.01
R5		1.01	0.17	0.01
R6		0.99	0.17	0.01
R7		0.84	0.14	0.00
R8		0.84	0.14	0.00
R9		0.81	0.14	0.00
R10		0.83	0.14	0.00
R11		0.70	0.12	0.00
R12		0.75	0.13	0.00
R13		1.51	0.26	0.01
R14		10.77	1.82	0.06
R15		1.44	0.24	0.01
R16		0.94	0.16	0.01
R17		1.58	0.27	0.01
R18		10.79	1.83	0.06
R19		0.95	0.16	0.01
R20		1.46	0.25	0.01

Receptor Name	Assessed Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_2	PM_{10}	CO
		Annual mean µg m^{-3}	Annual mean µg m^{-3}	8-hour mean µg m^{-3}
R21		2.05	0.35	0.01
R22		2.61	0.44	0.01
R23		2.52	0.43	0.01
R24		2.92	0.49	0.02
R25		6.93	1.17	0.04
R26		4.02	0.68	0.02
	Limit Value	40 µg m^{-3}	40 µg m^{-3}	10 µg m^{-3}

TABLE 12.20 AVG. POLLUTANT CONCENTRATIONS FROM TRAFFIC EMISSIONS EXC. BACKGROUND

Receptor Name	Assessed Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_2	PM_{10}	CO
		Annual mean µg m^{-3}	Annual mean µg m^{-3}	8-hour mean µg m^{-3}
Without Development	2034			
R1		15.67	15.35	0.21
R2		16.51	15.49	0.21
R3		15.35	15.30	0.21
R4		15.56	15.33	0.21
R5		15.37	15.30	0.21
R6		15.33	15.29	0.21
R7		15.20	15.27	0.20
R8		15.19	15.27	0.20
R9		15.15	15.26	0.20
R10		15.16	15.26	0.20
R11		15.04	15.24	0.20

Receptor Name	Assessed Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_2	PM_{10}	CO
		Annual mean µg m^{-3}	Annual mean µg m^{-3}	8-hour mean µg m^{-3}
R12		15.08	15.25	0.20
R13		15.80	15.37	0.21
R14		24.69	16.88	0.26
R15		15.74	15.36	0.21
R16		15.26	15.28	0.21
R17		15.87	15.38	0.21
R18		24.71	16.88	0.26
R19		15.26	15.28	0.21
R20		15.75	15.36	0.21
R21		16.32	15.46	0.21
R22		16.88	15.56	0.21
R23		16.98	15.57	0.21
R24		17.42	15.65	0.22
R25		21.75	16.38	0.24
R26		18.54	15.84	0.22
With Development	2034			
R1		15.65	15.35	0.21
R2		16.54	15.50	0.21
R3		15.32	15.29	0.21
R4		15.55	15.33	0.21
R5		15.32	15.29	0.21
R6		15.30	15.29	0.21
R7		15.15	15.26	0.20
R8		15.15	15.26	0.20

Receptor Name	Assessed Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_2	PM_{10}	CO
		Annual mean µg m^{-3}	Annual mean µg m^{-3}	8-hour mean µg m^{-3}
R9		15.12	15.26	0.20
R10		15.14	15.26	0.20
R11		15.01	15.24	0.20
R12		15.06	15.25	0.20
R13		15.82	15.38	0.21
R14		25.08	16.94	0.26
R15		15.75	15.36	0.21
R16		15.25	15.28	0.21
R17		15.89	15.39	0.21
R18		25.10	16.95	0.26
R19		15.26	15.28	0.21
R20		15.77	15.37	0.21
R21		16.36	15.47	0.21
R22		16.92	15.56	0.21
R23		16.83	15.55	0.21
R24		17.23	15.61	0.22
R25		21.24	16.29	0.24
R26		18.33	15.80	0.22
	Limit Value	40 µg m^{-3}	40 µg m^{-3}	10 µg m^{-3}

TABLE 12.21 AVG. POLLUTANT CONCENTRATIONS FROM TRAFFIC EMISSIONS INC. BACKGROUND

The predicted air quality pollutant concentration results have been compared with the relevant Air Quality Standards Regulations 2011. Using the information as described, based on the results of the ADMS Roads Assessment, it is predicted that the annual mean PM_{10}, CO and NO_2 limit values will not be exceeded at existing dwellings in the vicinity of the site or at dwellings as proposed within this application for permission.

Based on the EPUK & IAQM Guidance, Tables 8.18 – 8.20 summarise the ADMS Roads assessment predictions and the description of impact on air quality at the receptor locations.

Receptor Name	Average Change in 2034	Relative Change (% of AQAL)	Percentage of predicted concentration relative to AQAL	Predicted Impact
R1	0.02	0.05	39.11	Negligible
R2	0.03	0.08	41.36	Negligible
R3	0.03	0.08	38.29	Negligible
R4	0.01	0.02	38.88	Negligible
R5	0.05	0.14	38.29	Negligible
R6	0.03	0.08	38.25	Negligible
R7	0.05	0.11	37.88	Negligible
R8	0.03	0.08	37.88	Negligible
R9	0.03	0.07	37.80	Negligible
R10	0.01	0.03	37.86	Negligible
R11	0.03	0.07	37.53	Negligible
R12	0.02	0.05	37.65	Negligible
R13	0.02	0.06	39.55	Negligible
R14	0.40	0.99	62.71	Negligible
R15	0.02	0.05	39.39	Negligible
R16	0.00	0.01	38.14	Negligible
R17	0.01	0.04	39.72	Negligible
R18	0.40	0.99	62.76	Negligible
R19	0.00	0.01	38.15	Negligible
R20	0.02	0.05	39.42	Negligible
R21	0.04	0.10	40.91	Negligible
R22	0.04	0.10	42.30	Negligible
R23	0.15	0.37	42.08	Negligible
R24	0.19	0.47	43.08	Negligible
R25	-0.50	1.26	53.10	Negligible

Receptor Name	Average Change in 2034	Relative Change (% of AQAL)	Percentage of predicted concentration relative to AQAL	Predicted Impact
R26	-0.21	0.51	45.82	Negligible

TABLE 12.22 DESCRIPTION OF IMPACT ON AIR QUALITY (NO_2) AS A RESULT OF PROPOSED DEVELOPMENT (μG M^3) AT RECEPTOR LOCATIONS IN 2034.

Receptor Name	Average Change in 2034	Relative Change (% of AQAL)	Percentage of predicted concentration relative to AQAL	Predicted Impact
R1	0.00	0.01	38.37	Negligible
R2	0.01	0.01	38.75	Negligible
R3	0.01	0.01	38.23	Negligible
R4	0.00	0.00	38.33	Negligible
R5	0.01	0.02	38.23	Negligible
R6	0.01	0.01	38.22	Negligible
R7	0.01	0.02	38.16	Negligible
R8	0.01	0.01	38.16	Negligible
R9	0.00	0.01	38.14	Negligible
R10	0.00	0.01	38.15	Negligible
R11	0.00	0.01	38.10	Negligible
R12	0.00	0.01	38.12	Negligible
R13	0.00	0.01	38.44	Negligible
R14	0.07	0.17	42.36	Negligible
R15	0.00	0.01	38.41	Negligible
R16	0.00	0.00	38.20	Negligible
R17	0.00	0.01	38.47	Negligible
R18	0.07	0.17	42.37	Negligible
R19	0.00	0.00	38.20	Negligible
R20	0.00	0.01	38.42	Negligible
R21	0.01	0.02	38.67	Negligible

Receptor Name	Average Change in 2034	Relative Change (% of AQAL)	Percentage of predicted concentration relative to AQAL	Predicted Impact
R22	0.01	0.02	38.91	Negligible
R23	0.03	0.06	38.87	Negligible
R24	0.03	0.08	39.04	Negligible
R25	0.09	0.21	40.74	Negligible
R26	0.03	0.09	39.50	Negligible

TABLE 12.23 DESCRIPTION OF IMPACT ON AIR QUALITY (PM10) AS A RESULT OF PROPOSED DEVELOPMENT (µG M^3) AT RECEPTOR LOCATIONS IN 2035

Receptor Name	Average Change in 2034	Relative Change (% of AQAL)	Percentage of predicted concentration relative to AQAL	Predicted Impact
R1	0.00	0.00	2.07	Negligible
R2	0.00	0.00	2.12	Negligible
R3	0.00	0.00	2.06	Negligible
R4	0.00	0.00	2.07	Negligible
R5	0.00	0.00	2.06	Negligible
R6	0.00	0.00	2.05	Negligible
R7	0.00	0.00	2.05	Negligible
R8	0.00	0.00	2.05	Negligible
R9	0.00	0.00	2.05	Negligible
R10	0.00	0.00	2.05	Negligible
R11	0.00	0.00	2.04	Negligible
R12	0.00	0.00	2.04	Negligible
R13	0.00	0.00	2.08	Negligible
R14	0.00	0.02	2.56	Negligible
R15	0.00	0.00	2.08	Negligible
R16	0.00	0.00	2.05	Negligible
R17	0.00	0.00	2.08	Negligible

Receptor Name	Average Change in 2034	Relative Change (% of AQAL)	Percentage of predicted concentration relative to AQAL	Predicted Impact
R18	0.00	0.02	2.56	Negligible
R19	0.00	0.00	2.05	Negligible
R20	0.00	0.00	2.08	Negligible
R21	0.00	0.00	2.11	Negligible
R22	0.00	0.00	2.14	Negligible
R23	0.00	0.01	2.14	Negligible
R24	0.00	0.01	2.17	Negligible
R25	0.00	0.03	2.40	Negligible
R26	0.00	0.01	2.23	Negligible

TABLE 12.24 DESCRIPTION OF IMPACT ON AIR QUALITY (CO) AS A RESULT OF PROPOSED DEVELOPMENT (μG M^3) AT RECEPTOR LOCATIONS IN 2035

As outlined in Section 7 Assessing Significance of the EPUK & IAQM Guidance document a judgement of significance should be made by a competent professional. It is our professional judgement that there will be an insignificant impact on the air quality in the vicinity of the development as a result of the operational phase of the proposed development. Existing and proposed residents will not experience a significant air quality impact as deduced from the results of the ADMS Roads Assessment which compares air quality pollutant concentrations without and with the proposed mixed-use development.

12.8 Cumulative Impact

A search of Dublin City Council's planning database did not identify any significant applications for development permitted and not built or currently under consideration. Therefore, it is considered that the information used to inform this assessment represents the worst-case scenario.

12.9 Mitigation – Construction Phase

The mitigation measures have been divided into general measures and measures applicable specifically to demolition, earthworks, construction and trackout, for consistency with the assessment methodology. The following details the site-specific mitigation required for the proposed development.

Measure	Comment
Dust Management	• Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections. • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.

Measure	Comment
	• Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on or off site, and the action taken to resolve the situation in the log book. • Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary. • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. • 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 • Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Cover, seed of fence stockpiles to prevent wind whipping. • Ensure all vehicles switch off engines when stationary – no idling vehicles. • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction. • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and 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 methods.
Demolition	• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground

Measure	Comment
	Earthworks: • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surface as soon as practicable.
Construction	• 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. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

TABLE 12.25 DUST MITIGATION DURING CONSTRUCTION

Descriptor	Assessment	Comment
Quality of Effects	Neutral Effects	The predicted dust levels during construction have been shown to be low risk, once the identified mitigation measures have been incorporated into the site.
Significance of Effects	Not Significant	The dust levels may cause a noticeable change in the area, but there will not be significant consequences
Probability of Effects	Unlikely to Occur	The predicted dust levels are shown to be low risk and the proposed hours of operation are during normal daytime hours, which are less sensitive to existing residential properties.
Duration and Frequency of Effects	Short-Term Effects	The demolition and construction on the site would be expected to last between 1 to 7 years
Types of Effects	Do-nothing effects	The impacts of the construction are within appropriate limits for a short-term, they will not cause a significant ongoing impact in the vicinity of the site.

TABLE 12.26 DESCRIPTION OF EFFECTS – CONSTRUCTION PHASE

The nearest residential locations are across Coolock Drive. Duration of the construction works will not provide a long-term impact and the predicted levels impact from dust has been assessed to be low.

12.10 Mitigation – Operational Phase

Proposed residents will not experience a significant air quality impact as deduced from the results of the ADMS Roads Assessment which compares air quality pollutant concentrations without and with the proposed mixed-use development, hence no mitigation is deemed necessary.

Descriptor	Assessment	Comment
Quality of Effects	Neutral Effects	There are no significant air quality sources which will effect existing residential properties further away from the site. The additional traffic on the road will not cause a significant difference to the road network.
Significance of Effects	Not Significant	The changes to the air quality in the area will be slight and no proposed mitigation would be required, there will not be significant consequences
Probability of Effects	Unlikely effects	The site is primarily designed to minimise impact on the proposed residential development, as there will not be a significant impact on the existing properties in the wider area.
Duration and Frequency of Effects	Permanent Effects	The proposed site will be expected to last over 60 years
Types of Effects	Do-nothing effects	The site is zoned for regeneration so would be likely to be developed in the future with either residential or enterprise led development. The impact of this development is likely to be similar to future development on the site

TABLE 12.27 DESCRIPTION OF EFFECTS – OPERATIONAL PHASE

12.11 Residual Impacts

An air quality impact assessment has been undertaken for a proposed mixed-use development, Chivers Site, Coolock, Dublin.

Taking into consideration the original risk assessment of the proposed construction works and further to mitigation being enacted, it is concluded that no significant impacts will result as a consequence of the proposed development.

Proposed and existing residents will not experience a significant air quality impact as deduced from the results of the ADMS Roads Assessment which compares air quality pollutant concentrations without and with the proposed mixed-use development, hence no monitoring is deemed necessary.

Given the above, it can be concluded that residual effects from the construction and operation of the proposed development would not be deemed significant.

The assessment takes account of both the traffic predicted from the site development and the natural increase in the traffic flows in the area. Therefore, the cumulative assessment would reach similar conclusions, that the impact of the development would not be deemed significant when considered in additional to other expected increases in traffic levels.

12.12 Monitoring

Construction dust has the potential to impact at the nearest receptors outside of the proposed development. The nearest dwellings will generally be most affected and therefore assessing compliance with dust limits at those 'controlling points' will also ensure compliance at other dwellings further away. The following location has been identified as the controlling point for construction dust.

Location (nearest road)	Location (Irish Grid Reference)
ER1 – Coolock Drive	319624 239697
ER2 – Coolock Drive	319703 239788

TABLE 12.28 CONSTRUCTION DUST MONITORING LOCATION

Dust monitoring shall be conducted by the Site Manager or nominated sub-contractor by trained personnel.

The provisional monitoring programme for each type of activity is:

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Record any exceptional incidents that cause dust and/or air emissions, either on or off site, and the action taken to resolve the situation in the log book.
- Where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Proposed residents will not experience a significant air quality impact as deduced from the results of the ADMS Roads Assessment which compares air quality pollutant concentrations without and with the proposed mixed-use development, hence no monitoring is deemed necessary.

12.13 References and Sources

- Institute of Air Quality Management (IAQM) guidance "Land-Use Planning & Development Control: Planning for Air Quality" May 2015.
- Institute of Air Quality Management – 'Guidance on the Assessment of dust from demolition and construction' Version 1.1 2014
- Air Quality Standards Regulations 2011