



6080

Air Quality Impact Assessment

Air quality assessment report

ORCHARD GATE SHD

RESIDENTIAL APARTMENT DEVELOPMENT

**KENNELSFORT ROAD UPPER
PALMERSTOWN
CO DUBLIN**

AAI Palmerstown Ltd

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1 Introduction

1.1 Report purpose

This report describes the existing ambient air quality at the development area and examines the impact of the proposed development on air quality. The report also considers the air quality status for future residents at the proposed development. Recommended mitigation measures to control and minimise the impact that the development may have on local air quality are detailed in the final chapter.

1.2 Instruction

DKPartnership (DKP) have been commissioned by AAI Palmerstown Ltd to carry out the analysis and report for the proposed Orchard Gate residential development as described below.

1.3 Development detail

The development is located at the former warehouse facility at units 54 & 65, Cherry Orchard Industrial Estate. The site presents a gateway location at the western junction of Kennelsfort Road Upper and Cherry Orchard Industrial Estate Road. This location represents the start of the lands zoned 'REGEN' continuing to the east.

The proposal is for 144 no. 'build to sell' apartments and associated facilities with a mix of 72 no. one bedroom apartments and 72 no. 2 bedroom apartments. The development is set out in 4 no. five storey buildings enclosing a raised podium courtyard with the junction corner building having a 9-storey gateway feature element. On-site parking of 65 no. resident spaces is contained within a landscaped podium element with 2 no. on street care share spaces provided.

1.4 Legislation and guidelines

The Clean Air for Europe (CAFE) programme revisited the management of Air Quality within the EU and replaced the EU Framework Directive 96/62/EC with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC. This Directive is currently transposed into Irish legislation by the Air Quality Standards Regulations 2011. These limit values are binding in Ireland and have been set with the aim of protecting health. In addition, the following legislation and guidance were reviewed:

- National Roads Authority (2011), Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes
- Environmental Impacts Assessment Directive 2011/92/EU as amended by Directive 2014/52/EU
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, DRAFT August 2017)
- IAQM Land-Use Planning & Development Control: Planning for Air Quality
- IAQM Guidance on the assessment of dust from demolition and construction

2 Executive summary

2.1 Analysis conducted

The assessment identifies Irelands national air quality network, detailing relevant air quality standards. A review of air quality around the development site using existing EPA monitoring, an assessment of the impact on air quality during the construction phase/operational phase and the predicted air quality for future residents is outlined. Emissions impacting air quality for the main traffic-derived pollutants (nitrogen dioxide and particulate matter) have been predicted using the screening air quality assessment from the U.K Highway Agency Design Manual for Roads and Bridges (DMRB) Volume 11. The assessment also includes detailed recommended mitigation methods for controlling dust and air quality pollution.

2.2 Standards and regulations overview

To reduce the risk of poor air quality impacts, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. EU directives set baseline standards for monitoring air quality and reducing emissions in Ireland. In 2008 the European Commission introduced a new Directive on ambient air quality and cleaner air for Europe (2008/50/EC) which has been transposed into Irish Legislation through the revised Air Quality Standards Regulations (S.I. 180 of 2011). The Environmental Protection Agency (EPA) publish annual reports on air quality in Ireland that provide monitoring data. The most current EPA report - 2019 Annual Report on Air Quality in Ireland has been examined in order to assess the existing air quality conditions and to provide information on background concentrations.

2.3 Mitigation measures overview

Mitigation measures for both operation and construction of the development were assessed and detailed in section 6 of this report. In summary measures include where appropriate and practicable: wind breaks and barriers, frequent cleaning and watering of the construction site and associated access roads, control of vehicle access, vehicle speed restrictions, covering of piles, hard surface roads should be wet swept to remove any deposited materials and un-surfaced roads should be restricted to essential site traffic only. As outlined in the DMRB assessment, the operational phase was determined as not-significant with regards to an impact on local ambient air quality and as such there are no mitigation measures specified for the operational phase. The ongoing increase in public transport to reduce dependency on the use of the private car will furthermore reduce air quality impacts from transport.

2.4 Non-technical summary

The assessment identified the existing baseline levels in the area of the proposed development by an evaluation of EPA monitoring data. The air quality impact was considered for each distinct stage, construction phase and operational phase.

- The impact of the development during the construction phase on air quality at potential neighbouring receptors was determined by a theoretic assessment of dust soiling. Standard mitigation measures outlined in part 6.1 would be implemented onsite to control emissions during construction. With mitigation measures in place impacts of the proposed development on air quality for the construction phase is likely to result in negligible impacts.
- The impact of the development during the operational phase on air quality was determined by an assessment using the DMRB air quality model predicting pollutant concentrations over a period of time and is in line with what would be expected from a modern residential development. Results showed an expected small increase in annual NO₂, PM₁₀, benzene and CO but each parameter remain well below the limit values for EU regulations. This predicted increase above the existing situation results in a negligible impact and would not result in a perceptible change in the existing local air quality environment.
- On last inspection (September 2021) the Cherry Orchard industrial estate presented no business activities which exceed EPA emission thresholds. The proposed site is not in any immediate location of facilities that generate industrial emissions on a scale requiring an industrial IED or IPC license. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality.
- The predicted air quality index for future occupancies is index 1 & 2. Index 2 corresponding health advice for future residents for both general and at-risk groups of people is 'Enjoy your usual outdoor activities'. Overall the predicted AQIH is categorized as good for future occupancy.

3 Geographical overview

3.1 Project overview

Image 3.1, the (google maps) site map below shows the approximate location of the site with proposed development approximately outlined in the area site map.



Image 3.1 Approximate proposed development site

4 Approach and methodology

4.1 National air quality network

The EPA is the authority with responsibility for ambient air quality monitoring in Ireland and measures the levels of a number of atmospheric pollutants. Ambient air quality monitoring is carried out in accordance with the requirements of the CAFE Directive which has been transposed into Irish national legislation by the Air Quality Standards Regulations 2011. For the purposes of detailing ambient air quality in Ireland, it is divided into 4 zones: Zone A: Dublin, Zone B: Cork, Zone C: Other cities and large towns, Zone D: Rural Ireland.

In Ireland the network is managed by the EPA in partnership with Local Authorities and other public/semi-state bodies. A series of monitoring stations are located across the country, these stations collect air quality data for public information.

4.2 Air quality standards regulations

Air Quality Standards Regulations (S.I.180): These limits are for the protection of human health and are presented in Table 4.1. Air quality significance criteria are assessed on the basis of compliance with the standards or limit values presented below.

<i>Pollutant</i>	<i>Criteria</i>	<i>Value limit ($\mu\text{g}/\text{m}^3$)</i>
Nitrogen Dioxide (NO ₂)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200
	Annual limit for protection of human health	40
Benzene	Annual limit for protection of human health	5
Carbon Monoxide (CO)	Maximum daily 8-hour running mean	10000
Lead	Annual limit for protection of human health	0.5
Sulphur Dioxide (SO ₂)	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350
	Daily limit for protection of human health - not to be exceeded more than 3 times/year	125
Particulate Matter (PM ₁₀)	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50
	Annual limit for protection of human health	40
Particulate Matter (PM _{2.5})	Annual target value for the protection of human health	25

Table 4.1: Air quality standards regulations (S.I.180 of 2011)

4.3 Dust deposition guidelines

There are currently no national or European Union air quality standards with which levels of dust deposition can be compared. Dust levels can be influenced by industrial activities and transport sources. To measure dust deposition a figure of 350 mg/m²/day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, VDI 2129) can be applied to ensure that no nuisance effects will result. The Institute of Air Quality Management in the UK (IAQM) guidelines outline an assessment method for predicting the impact of dust emissions from construction activities based on the scale & nature of the works and the sensitivity of the area to dust impacts.

4.4 Current air quality trends in Ireland

Ireland's air quality is currently good relative to other EU States. The ambient air quality pollutants of most concern on an EU-wide level are nitrogen dioxide and particulate matter.

- Nitrogen Oxides (NO₂ and NO):

Nitrogen oxides are gaseous pollutants associated with traffic exhaust emissions. Nitrogen oxides include the gases nitrogen oxide (NO) and nitrogen dioxide (NO₂). Both pollutants are emitted to ambient air when petrol/diesel is burned. NO₂ is more important than NO from the EPA's point of view as its impact on health is higher. In terms of ambient air quality, the main source of nitrogen oxides in Ireland is road transport, with diesel vehicles producing more nitrogen oxides than petrol vehicles.

- Particulate Matter (PM₁₀ and PM_{2.5}):

PM consists of very small particles that are suspended in the air. There are two main types, PM₁₀ (diameter less than 10µm) and PM_{2.5} (diameter less than 2.5µm). There are many sources of PM, in Ireland the dominant sources of PM from human activities are solid fuels used in home heating in winter and the transport sector.

4.5 Receiving environment at Palmerstown (including neighbouring industrial estate)

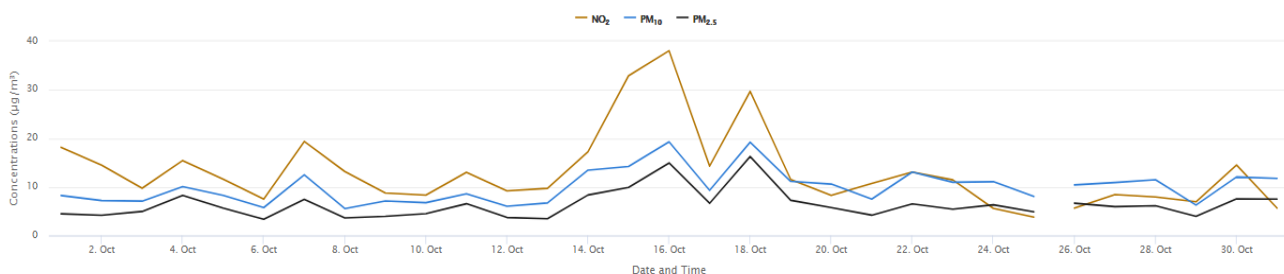
Palmerstown is a western Dublin suburb, approximately 12km from Dublin city centre. The Palmerstown area is bordered to the north by the River Liffey, to the west by Lucan, to the south-west by Clondalkin, to the south by Ballyfermot and to the east by the village of Chapelizod. The proposed development site borders industrial units to the east and south. Located west is existing residential estate Palmers crescent with Kennelsfort Road Upper in-between. Catering units are located immediately north with a community school further north.

The development area is located within an area which includes sources of transportation related air emissions principally from the Kennelsfort Road Upper and local industrial units and sources of domestic heating from nearby residential housing. Within the Cherry Orchard industrial estate there are no business activities which exceed EPA emission thresholds requiring an industrial IED or IPC license. The site is not in any immediate location of facilities that generate industrial emissions on a large scale. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality at the proposed development.

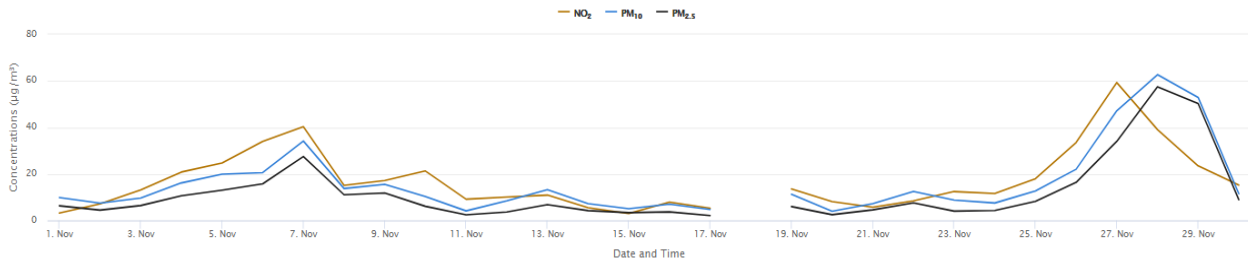
4.6 EPA local air quality monitoring results

The EPA publish annual reports on air quality in Ireland. These reports can be accessed via the EPA website at www.epa.ie. The most current EPA report 'Air Quality in Ireland 2019' has been examined in order to describe the existing air quality conditions and to provide information on background concentrations. The ambient air quality data collected and reviewed for the purpose of this study focused on the principal substances (NO₂ and PM emissions) which may be released from the site during the construction and operation phases and which may exert an influence on local air quality. The proposed residential development site is located within Zone A, the Dublin conurbation. The EPA monitor locally and nationally. The nearest local and national EPA air quality monitoring station from the development site is Ballyfermot, Dublin 10, approximately 2km away.

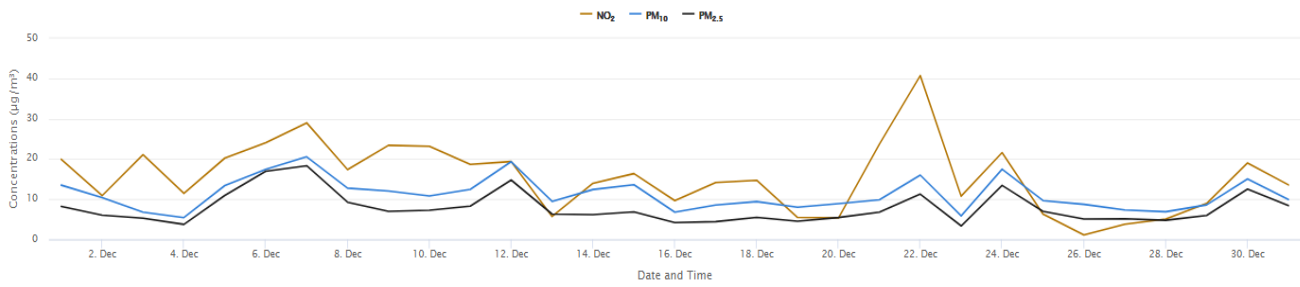
Local monitoring stations give people a rapid and up-to-date indication only, of air quality in their locality. Local monitoring data for PM and NO₂ can only be obtained up to a couple of months previous. The previous 6 months graphs for are illustrated below:



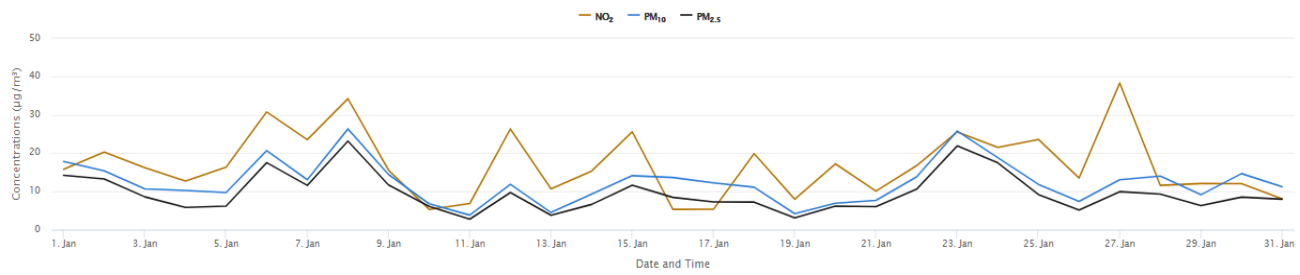
Oct 2020 monitoring data. Copyright EPA



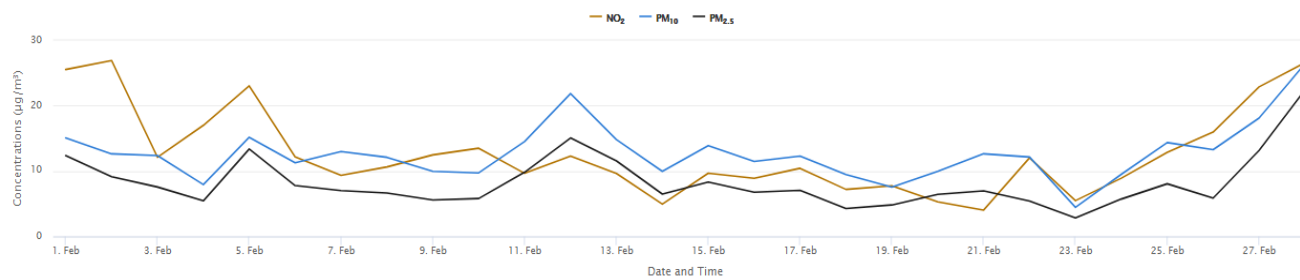
Nov 2020 monitoring data. Copyright EPA



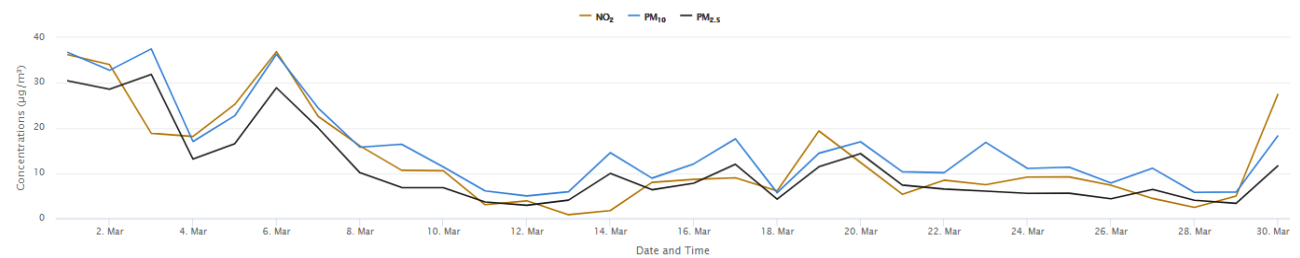
Dec 2020 monitoring data. Copyright EPA



Jan 2021 monitoring data. Copyright EPA



Feb 2021 monitoring data. Copyright EPA



Mar 2021 monitoring data. Copyright EPA



The national EPA air quality annual mean value concentrations measured at this monitoring site for 2019 are shown in Table 4.2.

<i>Pollutant</i>	<i>2019 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)</i>	<i>Annual Limit for Protection of Human Health ($\mu\text{g}/\text{m}^3$)</i>
Sulphur Dioxide (SO ₂)	1.5 *	20
Particulate Matter (PM ₁₀) (with a diameter <10 microns)	14	40
Particulate Matter (PM _{2.5}) (with a diameter <2.5 microns)	10	20
Nitrogen Dioxide (NO ₂)	20	40
Carbon Monoxide (CO)	0.3 (mg/m ³) *	10 (mg/m ³)
Benzene	0.3 *	5
Lead (Pb)	0.04 *	0.5

Table 4.2: Data from the EPA ambient air monitoring report 2019

* Ballyfermot monitoring station does not record all ambient air quality parameters outlined in the Directive. Therefore air quality in the receiving environment was assessed using the average annual mean value concentrations from all measured monitoring stations in Zone A from 2019.

4.7 Air quality for health

The EPA's air quality index for health (AQIH) is a number from 1 to 10 that tells you what the air quality currently is and whether or not this might affect the health of an individual. A reading of 10 means the air quality is very poor and a reading of one to three inclusive means that the air quality is good. Table 4.3 below illustrates this.

<i>Band</i>	<i>Index</i>	<i>NO₂ ($\mu\text{g}/\text{m}^3$)</i>	<i>PM_{2.5} ($\mu\text{g}/\text{m}^3$)</i>	<i>PM₁₀ ($\mu\text{g}/\text{m}^3$)</i>
Good	1	0-67	0-11	0-16
	2	68-134	12-23	17-33
	3	135-200	24-35	34-50
Fair	4	201-267	36-41	51-58
	5	268-334	42-47	59-66
	6	335-400	48-53	67-75
Poor	7	401-467	54-58	76-83
	8	468-534	59-64	84-91
	9	535-600	65-70	92-100
Very poor	10	>601	>71	>101

Table 4.3: Information from the EPA air quality index for health

The health advice associated with the AQIH for people is as follows in table 4.4.

<i>Band</i>	<i>Index</i>	<i>Health advice for general population</i>	<i>Health advice for At-risk groups</i>
Good	1	Enjoy your usual outdoor activities	Enjoy your usual outdoor activities
	2		
	3		
Fair	4	Enjoy your usual outdoor activities.	Adults and children with lung problems, and adults with heart problems, who experience symptoms, should consider reducing strenuous physical activity, particularly outdoors
	5		
	6		

Poor	7 8 9	Anyone experiencing discomfort such as sore eyes, cough or sore throat should consider reducing activity, particularly outdoors.	Adults and children with lung problems, and adults with heart problems, should reduce strenuous physical activity, particularly outdoors, and particularly if they experience symptoms.
Very poor	10	Reduce physical exertion, particularly outdoors, especially if you experience symptoms such as cough or sore throat	Adults and children with lung problems, adults with heart problems, and older people, should avoid strenuous physical activity.

Table 4.4: Irelands EPA air quality index for health advice information

4.8 Significance of EPA results

The EPA data of 2019 levels of pollutants show air quality parameters are all below the air quality limit values. The monthly monitoring data indicates the AQIH mostly falls into the category of index 1 and 2. Data shows on occasion air quality fluctuates to index 3 for PM₁₀ and PM_{2.5} but both would still be in the band of 'Good' air quality in terms of health for people in the vicinity.

It can be seen that the existing baseline air quality at the site locality can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values of individual pollutants. The quality of existing air quality at the subject site must be maintained and/or improved where possible.

4.9 Sensitive receptors

The principal local receptors that may be impacted by the development are existing residential dwellings to the west, Palmers crescent residential estate, located within a distance range of 25-35m. The non-domestic catering units north, located within a distance range of 12-30m and the industrial unit located east called 'Deli Meat Supplies', 16m distance away.

5 Air Quality Impact

5.1 Stages of development

When considering a new development the potential impact on air quality must be considered for each distinct stage.

- construction phase
- operational phase

It is important that there are no unacceptable decreases in ambient air quality levels predicted during the construction phases and during the operational phase.

5.2 Potential impact of the proposed development

Construction phase:

The construction phase of the development has the potential to generate short term dust emissions and may have the potential to impact air quality in the short term. Dust emissions can lead to elevated PM₁₀ and PM_{2.5} concentrations and may also cause dust soiling. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with ambient conditions, including rainfall, wind speed and the distance to potentially sensitive locations. The majority of any dust produced during the construction phase may be deposited close therefore any potential impacts from dust deposition will typically be close to the source.

The movements of construction vehicles on the site could also generate dust emissions. Where dusty waste material is loaded onto exposed open trucks, fine dusts may be released as the truck travels along public roads. Construction traffic to and from the site may have the potential to result in a short-term increase in the volume of HGV's along the local road network which may generate additional levels of exhaust emission compounds such as NO_x, CO and hydrocarbons such as benzene.

Operational phase:

The operational phase of the proposed development has the potential to result in an impact on local air quality primarily as a result of the increased traffic movements associated with the development. At the local scale the principal pollutants potentially are NO₂ and PM₁₀, the future occupancies health in regard to the air quality health index could be affected by this increase. The operational phase also has the potential to result in a slight impact on local air quality primarily as a result of the heating requirements. If the design of the development does not have the conservation of fuel and energy put into consideration it may result in a poor thermal efficiency resulting in an increase in the volume of fossil fuels required to heat the apartments/building.

5.3 Predicted impact of the proposed development

Construction phase:

There is a risk that dust can cause an impact at previously chosen sensitive receptors that are in close proximity to the source of the generated dust. Dust emissions can lead to elevated PM₁₀ and PM_{2.5} concentrations and is likely to also cause dust soiling. It is not easy to accurately quantify dust emissions arising from construction activities. A semi-quantitative approach is recommended by the National Roads Authority (NRA) Guidelines 2011 to determine the likelihood of a significant impact. The construction assessment guidelines reproduced from the NRA guidance, are set out in Table 5.1.

Source		Potential Distance for Significant Effects (distance from source)		
Scale	Description	Soiling	PM ₁₀	Vegetation Effects
Major	Large Construction sites, with high use of haul routes.	100m	25m	25m
Moderate	Moderate Construction sites, with moderate use of haul routes.	50m	15m	15m
Minor	Minor Construction sites, with minor use of haul routes.	25m	10m	10m

Table 5.1: Assessment criteria for the impact of dust from construction activities with standard mitigation in place (NRA 2011)

While dust from construction activities tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. Some of the Palmers crescent residential estate, located within a distance range of 25-35m. Some of the residential dwellings in the Palmers crescent neighbourhood are located within 25-35m of the site. Likewise, the industrial units north and east is located within 50m of the site. Where dust impacts are likely, avoidance and mitigation measures will be put in place to reduce the impact levels such as wind breaks, barriers and frequent cleaning and watering of the construction site roads, further detailed mitigation measures discussed in section 6.

The Institute of Air Quality Management in the UK (IAQM) guidelines outline an assessment method for predicting the impact of dust emissions from construction based on the scale and nature of the works and the sensitivity of the area to dust impacts. In terms of receptor sensitivity to dust soiling, there are between 1-10 high sensitivity (residential) receptors likely to be located less than 50m from the proposed construction works which is considered a low sensitivity environment for dust soiling according to the criteria outlined in Table 5.2.

Receptor sensitivity	No. 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

Table 5.2: Sensitivity of the area to dust soiling effects on people and property

The significance of impacts due to vehicle emissions during the construction phase will be dependant on the number of additional vehicle movements, HGVs and the closeness of sensitive receptors to the site. Increases in levels to PM and pollutants related to increased traffic can be predicted however relative to baseline levels, the impact of the proposed development during construction will not have an adverse impact in concentrations over the limit of regulation values.

The IAQM guidelines indicate that it is necessary to classify the significance of the existing environment along with magnitude of change to derive significance. Using these guidelines, the magnitude of change is 'negligible' and the significance of this is 'not significant'.

Operational phase:

The design and construction of buildings in accordance with National Building Regulations (The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel & Energy – Dwellings) will ensure that modern building materials are used and that they are designed to be thermally efficient resulting in a reduction in the volume of fossil fuels required to heat the buildings. In order to counteract the impact of the development on the existing and future air quality the design of the proposed residential apartments and houses has considered a number of sustainable heating and energy saving features.

The operational phase of the proposed development also has the potential to result in an impact on local air quality primarily as a result of the increased traffic movements associated with the development. It is envisioned that a proportion of the commuting residents will avail of Dublin Bus commuter services. The availability of public transport will significantly reduce the number of private vehicles exiting and entering the development. However the DMRB screening air quality spreadsheet from the U.K Highway Agency Design Manual for Roads and Bridges, was used to assess the impact of increased traffic associated with the new development.

Projected transport figures were used to predict the concentrations of traffic-derived pollutants in future years. The model then combined background concentrations of pollutants, sourced from the EPA report on ambient air quality in 2019 with predicted concentrations. Results were generated using an average speed of 20 km/h assuming congested traffic conditions. Using the DMRB screening air quality spreadsheet, pollutant concentrations in 2026 were predicted at the sensitive receptors. The receptor Palmers Crescent residential neighbourhood near the Kennelsfort Road Upper was chosen as the sensitive receptor. In order to quantify the magnitude of change in pollutant concentrations, the descriptors in table 5.3 were used. To describe the significance of the impact, table 5.4 was then used. These descriptor tables are from the EPA (2017) Guidelines on the Information to be contained in Environmental Impact Assessment Reports.

<i>Magnitude of Change</i>	<i>Annual Mean NO₂ (µg/m³)</i>	<i>No. of Days with PM₁₀ concentration greater than 50 µg/m³</i>	<i>Annual Mean PM (µg/m³)</i>
Large	Increase/decrease ≥4	Increase/decrease >4 days	Increase/decrease ≥2.5
Medium	Increase/decrease 2 - <4	Increase/decrease 3 or 4 days	Increase/decrease 1.25 - <2.5
Small	Increase/decrease 0.4 - <2	Increase/decrease 1 or 2 days	Increase/decrease 0.25 - <1.25
Imperceptible	Increase/decrease <0.4	Increase/decrease <1 day	Increase/decrease <0.25

Table 5.3: Definition of impact magnitude for changes in ambient air pollutant concentrations.

<i>Absolute Concentration in Relation to Objective /Limit Value</i>	<i>Changes in Concentration</i>		
	<i>Small</i>	<i>Medium</i>	<i>Large</i>
	<i>Increase with Scheme</i>		
Above Limit Value with Scheme (≥40µg/m ³ of NO ₂ or PM ₁₀) (≥25µg/m ³ of PM _{2.5})	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Limit Value with Scheme (36-<40µg/m ³ of NO ₂ or PM ₁₀) (22.5-<25µg/m ³ of PM _{2.5})	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Limit Value with Scheme (30-<36µg/m ³ of NO ₂ or PM ₁₀) (18.75-<22.5µg/m ³ of PM _{2.5})	Negligible	Slight Adverse	Slight Adverse
Well Below Limit Value with Scheme (<30µg/m ³ of NO ₂ or PM ₁₀) (<18.75µg/m ³ of PM _{2.5})	Negligible	Negligible	Slight Adverse

Table 5.4: Air quality impact descriptors for changes in annual mean NO₂, PM₁₀ and PM_{2.5} concentrations at a receptor.

The results of the impact assessment arising from increased transport are presented in Table 5.5. The results predict the 2026 air quality relative to the existing baseline. The impact equates to a 'medium' increase (based on the NRA criteria) in annual average NO₂ for this receptor. Using the NRA significance criteria, it results in a 'negligible' impact. The modelled PM₁₀ impact equates to a 'small' increase in annual average PM₁₀. Using the NRA significance criteria a small increase in annual average PM₁₀ results in a 'negligible' impact in terms of local impact as a result of cumulative traffic.

<i>Scenarios</i>	<i>Annual Average NO₂ (µg/m³)</i>	<i>Annual Average PM₁₀ (µg/m³)</i>	<i>Annual Average (µg/m³)Benzene</i>	<i>Annual Average CO (µg/m³)</i>
Background	20.0	14.0	0.3	0.3
2026	22.6	14.46	0.33	0.32
Increase	+ 2.6	+ 0.46	+ 0.03	+ 0.02
Limits	40	40	5	10

Table 5.5: Modelled results for Palmers Crescent

Results show an expected small increase in annual NO₂, PM₁₀, benzene and CO but each parameter remain well below the limit values for EU regulations. This predicted increase above the existing situation results in a negligible impact and would not result in a perceptible change in the existing local air quality environment.

5.4 Predicted impact on future occupancy at Orchard Gate

Using the predicted operational traffic flow modelled data (which assumed constant congested traffic conditions at the site for worst case scenario) the air quality index for future occupancies health puts the site in an index 1 category. The previous 6 months of local monitoring data indicate that the area is mostly in an index 1 and 2 category with a few occasions of levels recorded at index 3 for PM₁₀ readings. These predicted air emissions at the site still have the same health advice for people which is 'Enjoy your usual outdoor activities'. At-risk groups of the population have the same health advice in index 1, 2 & 3 of 'Enjoy your usual outdoor activities'. The predicted AQIH is good for future occupancy.

It is worth noting any measures to promote and improve the attractiveness of using public transport, cycling, walking, car sharing or a combination of these as alternatives to single occupancy private car travel could potentially improve the AQIH in the future.

On last inspection (September 2021) the Cherry Orchard industrial estate presented no business activities which exceed EPA emission thresholds. The proposed site is not in any immediate location of facilities that generate industrial emissions on a scale requiring an industrial IED or IPC license. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality at the proposed development.

6 Mitigation measures

6.1 Remedial and reductive measures

Construction phase: In order to mitigate dust emissions and minimise air quality impacts during the construction phase, placing activities which are a potential source of dust away from boundaries would minimise the possibility of exposure. If this measure is implemented, then impacts on dust concentrations at local receptors are capable of being reduced. Standard mitigation measures would be implemented onsite to control emissions during construction, these include:

- Any required demolition works to be undertaken in a phased and controlled manner. The dampening down of potential dust generating demolition activities. Avoid unnecessary vehicle movements and limit speeds on site so as to minimise the generation of airborne dust.
- Site roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud/aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only. Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- location of temporary storage of dusty materials and material transfer operations as far from the nearest sensitive receptors as practicable. Aggregates will be transported to and from the site in covered trucks.
- Exhaust emissions from vehicles operating within the construction site or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles along with the avoidance of engines running unnecessarily and the use of low emission fuels.
- All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage.
- All plant machinery not in operation shall be turned off and idling engines shall not be permitted for excessive periods. Where drilling or pavement cutting, grinding or similar types of operations are taking place, measures to control dust emissions will be used by the erection of wind breaks or barriers.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

Operational phase: As outlined in the DMRB assessment, it is likely the operational phase will not generate air emissions that would have an adverse impact on local ambient air quality and as such there are no mitigation measures specified for the operational phase. The government aims to promote sustainability by enhancing public transport with regular and ongoing increases in the public transport capacity, both road and rail and to reduce dependency on the use of the private car. These alternatives as well as the increasing use of electric vehicles could potentially improve the air quality emission impact in the future.

6.2 Monitoring

If the construction contractor adheres to good working practices and the mitigation measures are in place, the levels of emission generated are assessed to be minimal and are unlikely to cause an impact on air quality. No monitoring is deemed necessary.

6.3 Air quality impact summary

The assessment identified the existing baseline levels in the area of the proposed development by an evaluation of EPA monitoring data. The air quality impact was considered for each distinct stage, construction phase and operational phase.

- The impact of the development during the construction phase on air quality at potential neighbouring receptors was determined by a theoretic assessment of dust soiling. Standard mitigation measures outlined in part 6.1 would be implemented onsite to control emissions during construction. With mitigation measures in place impacts of the proposed development on air quality for the construction phase is likely to result in negligible impacts.
- The impact of the development during the operational phase on air quality was determined by an assessment using the DMRB air quality model predicting pollutant concentrations over a period of time and is in line with what would be expected from a modern residential development. Results showed an expected small increase in annual NO₂, PM₁₀, benzene and CO but each parameter remain well below the limit values for EU regulations. This

predicted increase above the existing situation results in a negligible impact and would not result in a perceptible change in the existing local air quality environment.

- On last inspection (September 2021) the Cherry Orchard industrial estate presented no business activities which exceed EPA emission thresholds. The proposed site is not in any immediate location of facilities that generate industrial emissions on a scale requiring an industrial IED or IPC license. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality.
- The predicted air quality index for future occupancies is index 1 & 2. Index 2 corresponding health advice for future residents for both general and at-risk groups of people is 'Enjoy your usual outdoor activities'. Overall the predicted AQIH is categorized as good for future occupancy.