

Air Quality Assessment
Redevelopment of Deacon Business Park

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Executive Summary

Redmore Environmental Ltd was commissioned by EEIP II Arundel Propco 2 Holdings Limited to undertake an Air Quality Assessment in support of a commercial development on land at Deacon Business Park, off Moorgate Road North, Knowsley.

The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

Review of the dispersion modelling results indicated that predicted air quality impacts as a result of traffic generated by the development were not significant at any sensitive location in the vicinity of the site.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by EEIP II Arundel 2 Holdings Limited to undertake an Air Quality Assessment in support of a commercial development on land at Deacon Business Park, off Moorgate Road North, Knowsley.

1.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

1.2 Site Location and Context

1.2.1 The site is located on land at Deacon Business Park, off Moorgate Road North, Knowsley, at approximate National Grid Reference (NGR): 342544, 397584. Reference should be made to Figure 1 for a site location plan.

1.2.2 The proposals comprise the demolition of existing industrial accommodation and erection of warehouse (Use Class B8) with ancillary offices (Use Class E(g)), reconfigured points of access, new security gatehouses and associated works.

1.2.3 The development has the potential to cause air quality impacts at sensitive locations. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the site during the operational phase. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions and assess potential effects as a result of the proposals. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 UK Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO₂);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5});
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values have also been provided for several additional pollutants. It should be noted that the AQLV for PM_{2.5} stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007¹. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 Table 1 presents the AQOs and AQLVs for pollutants considered within this assessment.

¹ The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

Table 1 Air Quality Objectives/Air Quality Limit Values

Pollutant	Air Quality Objective/Air Quality Limit Value	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
PM _{2.5}	20	Annual mean

2.1.5 The Environment Act (2021) was published on 9th November 2021 and makes provision for the setting of lower PM_{2.5} targets. However, the AQLV outlined in Table 1 remains the adopted air quality standard within the UK until further legislation is implemented.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance² on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

² Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.2 **Local Air Quality Management**

2.2.1 Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 **Dust**

2.3.1 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of

the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework³ (NPPF) was published in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

2.4.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality [...]."

³ NPPF, Ministry of Housing, Communities and Local Government, 2021.

- 2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

- 2.4.5 The implications of the NPPF have been considered throughout this assessment.

2.5 National Planning Practice Guidance

- 2.5.1 The National Planning Practice Guidance⁴ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

⁴ <https://www.gov.uk/guidance/air-quality--3>.

2.5.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.6 Local Planning Policy

2.6.1 The Knowsley Local Plan: Core Strategy⁵ was adopted by Knowsley Metropolitan Borough Council (KMBC) on 26th January 2016. Review of the document indicated the following policy of relevance to this report:

"Policy CS2

Development Principles

1) New development in Knowsley and the preparation of subsequent stages of the Local Plan will be expected to support the following development principles:

Principal 4: Recognise environmental limits, protect and enhance environmental assets, enhance local character and promote air quality of place by:

e) Mitigating potential negative impacts of traffic growth and road traffic on highway safety, air quality, noise and health;

[...]

J) Minimising negative impact upon flood risk, air quality, water quality, land quality, soil quality and noise or vibration levels and ensuring negative impacts are appropriately mitigated."

2.6.2 The Knowsley Replacement Unitary Development Plan (UDP)⁶ was adopted in June 2006. Under the transitional arrangements for moving to the Local Plan system, 39 UDP Policies have been saved, these include the following in relation to air quality:

"Policy ENV1: Control of Pollution in New Development

⁵ Knowsley Local Plan: Core Strategy, KMBC, 2016.

⁶ Knowsley Replacement UDP, KMBC, 2006.

Development will not be permitted which is likely to cause significant harm to amenity as a result of impact on any of the following:

a) Air quality;

[...]"

2.6.3 The above policies have been taken into consideration throughout the undertaking of this assessment.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases. These have been assessed in accordance with the following methodology, which was agreed with Helene Bradshawe, Environmental Protection Officer at KMBC, on 28th November 2022.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'⁷.

3.2.2 Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and,
- Trackout.

3.2.3 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM₁₀.

3.2.4 The assessment steps are detailed below.

⁷ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Step 1

3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 500m from the site entrance, then the assessment also proceeds to Step 2.

3.2.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2

3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

3.2.9 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total volume of building to be demolished greater than 50,000m³ • Potentially dusty material (e.g. concrete) • On-site crushing and screening • Demolition activities more than 20m above ground level

Magnitude	Activity	Criteria
	Earthworks	- Total site area greater than 10,000m² - Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) - More than 10 heavy earth moving vehicles active at any one time - Formation of bunds greater than 8m in height - More than 100,000 tonnes of material moved
	Construction	- Total building volume greater than 100,000m³ - On site concrete batching - Sandblasting
	Trackout	- More than 50 Heavy Duty Vehicle (HDV) trips per day - Potentially dusty surface material (e.g. high clay content) - Unpaved road length greater than 100m
Medium	Demolition	- Total building volume between 20,000m³ and 50,000m³ - Potentially dusty construction material - Demolition activities 10m to 20m above ground level
	Earthworks	- Total site area 2,500m² to 10,000m² - Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time - Formation of bunds 4m to 8m in height - Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	- Total building volume 25,000m³ to 100,000m³ - Potentially dusty construction material (e.g. concrete) - On site concrete batching
	Trackout	10 to 50 HDV trips per day - Moderately dusty surface material (e.g. high clay content) - Unpaved road length 50m to 100m
Small	Demolition	- Total volume of building to be demolished less than 20,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber) - Demolition activities less than 10m above ground and during wetter months

Magnitude	Activity	Criteria
	Earthworks	- Total site area less than 2,500m² - Soil type with large grain size (e.g. sand) - Less than 5 heavy earth moving vehicles active at any one time - Formation of bunds less than 4m in height - Total material moved less than 20,000 tonnes - Earthworks during wetter months
	Construction	- Total building volume less than 25,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	- Less than 10 HDV trips per day - Surface material with low potential for dust release - Unpaved road length less than 50m

3.2.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

Table 4 Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	- Users expect high levels of amenity - High aesthetic or value property - People expected to be present continuously for extended periods of time - Locations where members of the public are exposed over a time period relevant to the AQO for PM₁₀. e.g. residential properties, hospitals, schools and residential care homes	Internationally or nationally designated site e.g. Special Area of Conservation
Medium	- Users would expect to enjoy a reasonable level of amenity - Aesthetics or value of their property could be diminished by soiling - 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 e.g. parks and places of work	Nationally designated site e.g. Sites of Special Scientific Interest

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.11 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

3.2.12 These factors were considered in the undertaking of this assessment.

3.2.13 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

Table 5 Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.14 Table 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 6 Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Background Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m ³	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low

Receptor Sensitivity	Background Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
	28 - 32µg/m ³	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

3.2.15 Table 7 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 7 Construction Dust - Sensitivity of the Area to Ecological Impacts

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

3.2.16 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

3.2.17 Table 8 outlines the risk category from demolition activities.

Table 8 Construction Dust - Dust Risk Category from Demolition Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

3.2.18 Table 9 outlines the risk category from earthworks and construction activities.

Table 9 Construction Dust - Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

3.2.19 Table 10 outlines the risk category from trackout activities.

Table 10 Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

3.2.20 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance⁸ to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

3.2.21 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

3.2.22 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The IAQM guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

3.3 Operational Phase Assessment

3.3.1 The development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. Potential impacts have therefore been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2019 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2025 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2025 should the proposals be completed).

⁸ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

- 3.3.2 Reference should be made to Appendix 1 for assessment input data and details of the verification process.
- 3.3.3 Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)⁹ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance¹⁰ on where the AQOs apply, as summarised in Table 2, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the development.
- 3.3.4 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'¹¹. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in Table 11.

Table 11 Significance of Operational Phase Road Vehicle Exhaust Emissions Impact

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Proportion of AQO/AQLV (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO/AQLV	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO/AQLV	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO/AQLV	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO/AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQO/AQLV	Moderate	Substantial	Substantial	Substantial

- 3.3.5 The matrix shown in Table 11 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

⁹ LA 105: Air Quality, Highways England, 2019.

¹⁰ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

¹¹ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document¹² provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- 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.

3.3.7 The IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

3.3.8 The determination of significance relies on professional judgement and reasoning has been provided as far as practicable. The IAQM guidance¹³ suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

¹² Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

¹³ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

4.0 BASELINE

4.1 Introduction

- 4.1.1 Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

- 4.2.1 As required by the Environment Act (1995), KMBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that all pollutants considered within the AQS are currently below the relevant AQOs. As such, no AQMA's have been designated within the borough.
- 4.2.2 The site is located approximately 1.7km west of Liverpool City Council's (LCC's) administrative extents. LCC also undertake Review and Assessment of air quality. This has indicated that annual mean NO₂ concentrations are above the AQO within the city. As such, one AQMA has been declared. This is described as follows:

"An area encompassing the whole of the City of Liverpool."

- 4.2.3 The site is located approximately 1.7km west of the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the undertaking of the assessment.
- 4.2.4 LCC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMA's have been designated.

4.3 Air Quality Monitoring

- 4.3.1 Monitoring of pollutant levels is undertaken by KMBC throughout their area of jurisdiction. Recent NO₂ concentrations recorded in the vicinity of the development are shown in Table 12.

Table 12 Monitoring Results

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)		
		2018	2019	2020
K7	LC067 Corner of County Road and Webster	-(a)	29.6	24.1
K8	LC002 Outside Webster Drive	-(a)	32.4	28.7
K9	LC017 on Cherryfield Drive	-(a)	29.4	27.7
K10	Outside 19 Moorgate Road (A5207)	-(a)	29.4	24.1

Note: (a) Monitoring data not available

4.3.2 As shown in Table 12, annual mean NO₂ concentrations were below the AQO of 40µg/m³ at all monitoring locations in recent years.

4.3.3 It should be noted that pollutant concentrations during 2020 were lower than previous years due to a reduction in road traffic and associated emissions caused by the COVID-19 pandemic. The results should therefore be viewed with caution.

4.3.4 KMBC do not undertake PM₁₀ or PM_{2.5} monitoring within the vicinity of the site.

4.4 Background Pollutant Concentrations

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 342500, 397500. Data for this location was downloaded from the DEFRA website¹⁴ for the purpose of the assessment and is summarised in Table 13.

Table 13 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2019	2022	2025
NO ₂	17.74	14.84	10.51

¹⁴ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

Pollutant	Predicted Background Pollutant Concentration ($\mu\text{g}/\text{m}^3$)		
	2019	2022	2025
PM ₁₀	15.77	14.31	10.10
PM _{2.5}	14.27	13.94	9.80

4.4.2 As shown in Table 13, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and AQLV at the development site.

4.5 Sensitive Receptors

4.5.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Construction Phase Sensitive Receptors

4.5.2 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 14.

Table 14 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	0
Up to 50	More than 100	0
Up to 100	More than 100	-
Up to 350	More than 100	-

4.5.3 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 15.

Table 15 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	-
Up to 50	More than 100	-

4.5.4 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 16.

Table 16 Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	The baseline review did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal indicated that several applications that have recently been granted permission within 700m of the site. It is therefore possible that there will be concurrent dust generation in the area should the construction phases overlap with that of the proposal
Pre-existing screening between the source and the receptors	There is no significant screening around the site boundary
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the south-west with significant frequencies from the west. As such, receptors to the north-east and east of the development are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is likely that it will extend over one year. The sensitivity of the surrounding area is unlikely to change during this period
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.5.5 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties.

4.5.6 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 17.

Table 17 Sensitivity of the Surrounding Area to Potential Dust Impacts

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

Operational Phase Sensitive Receptors

4.5.7 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 18.

Table 18 Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Moorgate Road North	342417.2	397760.6
R2	Residential - Moorgate Road North	342178.1	397280.6
R3	Park Brow Community Primary School	342347.9	397999.4
R4	Residential - A5208	342032.4	398363.3
R5	Residential - A5208	342069.2	398402.0
R6	Residential - A5208	343488.0	397612.3
R7	Residential - A580	341290.4	396779.7
R8	Residential - A580	340472.3	396493.4
R9	Residential - A580	339538.6	396032.1
R10	Residential - A580	338808.4	395638.9

Receptor		NGR (m)	
		X	Y
R11	Residential - A580	338758.2	395565.3
R12	Residential - Lower House Lane	339114.6	395464.9
R13	Residential - Long House Lane	338912.1	395890.0

4.5.8 Reference should be made to Figure 4 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

5.0 ASSESSMENT

5.1 Introduction

- 5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the proposed development. These are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

- 5.2.1 The undertaking of activities such as demolition, excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.
- 5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.
- 5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Demolition

- 5.2.4 Demolition will be undertaken at the start of the construction phase and will involve clearance of existing buildings on site. It is estimated that the building volume to be demolished is between 20,000m³ and 50,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from demolition is therefore **medium**.

5.2.5 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for dust soiling as a result of demolition activities.

5.2.6 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health impacts as a result of demolition activities.

Earthworks

5.2.7 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The site area is greater than 10,000m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **large**.

5.2.8 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **high** risk site for dust soiling as a result of earthworks.

5.2.9 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9 the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

Construction

5.2.10 The total building volume to be constructed will be more than 100,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

5.2.11 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **high** risk site for dust soiling as a result of construction activities.

5.2.12 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health impacts as a result of construction activities.

Trackout

5.2.13 Based on the site area and existing hard standing provision, it is anticipated that the unpaved road length is likely to be between 50m and 100m during certain stages of construction. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **medium**.

5.2.14 Table 17 indicates the sensitivity of the area to dust soiling effects to people and property is **high**. In accordance with the criteria outlined in Table 10, the development is considered to be a **medium** risk site for dust soiling as a result of trackout.

5.2.15 Table 17 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 10, the development is considered to be a **low** risk site for human health impacts as a result of trackout.

Summary of the Risk of Dust Effects

5.2.16 A summary of the risk from each dust generating activity is provided in Table 19.

Table 19 Summary of Potential Unmitigated Dust Risks During Construction

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

5.2.17 As indicated in Table 19, the potential risk of dust soiling is **high** from earthworks, construction and trackout and **medium** from demolition. The potential risk of human health impacts is **low** from demolition, earthworks, construction and trackout.

5.2.18 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

Step 3

5.2.19 The IAQM guidance¹⁵ provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 20. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan (CEMP) or similar if required by the LA.

Table 20 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken • Make the complaints log available to the LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	• 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 LA when asked • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions

¹⁵ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Issue	Control Measure
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site • Fully enclose site or specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • Keep site fencing and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used • Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable • Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas • Produce a Construction Logistics Plan to manage the sustainable delivery of goods
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires or burning of waste materials
Demolition	• Ensure effective water suppression is used during demolition operations • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable • Only remove the cover in small areas during work and not all at once

Issue	Control Measure
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery
Trackout	• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable • Record all inspections of haul routes and any subsequent action in a site log book • Implement a wheel washing system, if required • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits

Step 4

5.2.20 Assuming the relevant mitigation measures outlined in Table 20 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁶.

5.3 Operational Phase Assessment

5.3.1 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site.

5.3.2 The assessment included the following scenarios:

- 2019 - Verification;

¹⁶ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

- 2025 - DM; and,
- 2025 - DS.

5.3.3 The DM scenario (i.e. without development) included baseline traffic data, inclusive of anticipated growth for the relevant assessment year. The DS scenario (i.e. with development) included baseline traffic data, inclusive of anticipated growth for the relevant assessment year, in addition to predicted vehicle trips associated with the operation of the proposals.

5.3.4 For the purpose of the assessment traffic data for 2025 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2019 were utilised within the dispersion model. The use of 2025 traffic data and 2019 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

5.3.5 Reference should be made to Appendix 1 for full assessment input details.

Predicted Concentrations

5.3.6 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 21. Exceedences of the AQO are shown in **bold**.

Table 21 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Moorgate Road North	31.18	31.05	-0.13
R2	Residential - Moorgate Road North	26.93	27.18	0.25
R3	Education - Park Brow Community Primary School	21.44	21.41	-0.03
R4	Residential - A5208	23.40	23.26	-0.14
R5	Residential - A5208	23.29	23.15	-0.14
R6	Residential - A5208	22.90	22.91	0.01

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R7	Residential - A580	43.19	43.24	0.05
R8	Residential - A580	30.06	30.09	0.03
R9	Residential - A580	23.30	23.31	0.01
R10	Residential - A580	35.25	35.28	0.03
R11	Residential - A580	29.31	29.34	0.03
R12	Residential - Lower House Lane	24.18	24.20	0.02
R13	Residential - Long House Lane	27.28	27.28	0.00

5.3.7 As indicated in Table 21, predicted annual mean NO₂ concentrations were above the relevant AQO at one receptor and below at the remaining positions in both the DM and DS scenarios. It should be noted that there were no additional predicted exceedences in the DS scenario when compared with the DM.

5.3.8 It should be noted that the proposed development is forecast to generate less traffic overall than the existing unit, but there is anticipated to be increase in HDV movements due to the change of land use. As such, pollutant concentrations are predicted to decrease at some receptors and increase at others, dependant on the change in flow and fleet composition on nearby road links.

5.3.9 Reference should be made to Figures 5 and 6 for graphical representations of annual mean NO₂ concentrations within the Liverpool AQMA for the DM and DS scenarios, respectively.

5.3.10 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Table 22 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Moorgate Road North	17.80	17.77	-0.03
R2	Residential - Moorgate Road North	16.80	16.85	0.06
R3	Education - Park Brow Community Primary School	15.51	15.50	-0.01
R4	Residential - A5208	16.03	16.00	-0.03
R5	Residential - A5208	16.00	15.97	-0.03
R6	Residential - A5208	15.92	15.92	0.00
R7	Residential - A580	19.91	19.92	0.02
R8	Residential - A580	17.60	17.61	0.01
R9	Residential - A580	16.04	16.05	0.00
R10	Residential - A580	18.81	18.82	0.01
R11	Residential - A580	17.40	17.40	0.00
R12	Residential - Lower House Lane	16.13	16.14	0.00
R13	Residential - Long House Lane	16.77	16.78	0.00

5.3.11 As indicated in Table 22, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both the DM and DS scenarios.

5.3.12 Reference should be made to Figures 7 and 8 for graphical representations of annual mean PM₁₀ concentrations within the AQMA for the DM and DS scenarios.

5.3.13 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 23.

Table 23 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Moorgate Road North	12.22	12.20	-0.02
R2	Residential - Moorgate Road North	11.64	11.67	0.03
R3	Education - Park Brow Community Primary School	10.90	10.90	-0.00
R4	Residential - A5208	11.20	11.18	-0.02
R5	Residential - A5208	11.18	11.16	-0.02
R6	Residential - A5208	11.14	11.14	0.00
R7	Residential - A580	13.48	13.49	0.01
R8	Residential - A580	12.10	12.11	0.00
R9	Residential - A580	11.21	11.21	0.00
R10	Residential - A580	12.80	12.80	0.00
R11	Residential - A580	11.98	11.98	0.00
R12	Residential - Lower House Lane	11.26	11.26	0.00
R13	Residential - Long House Lane	11.63	11.63	0.00

5.3.14 As indicated in Table 23, predicted annual mean PM_{2.5} concentrations were below the AQLV at all sensitive receptors in both the DM and DS scenarios.

5.3.15 Reference should be made to Figures 9 and 10 for graphical representations of annual mean PM concentrations within the AQMA for the DM and DS scenarios.

Predicted Impacts

5.3.16 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 24.

Table 24 Predicted Impacts - NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Moorgate Road North	76 - 94% of AQO	0	Negligible
R2	Residential - Moorgate Road North	Below 75% of AQO	1	Negligible
R3	Education - Park Brow Community Primary School	Below 75% of AQO	0	Negligible
R4	Residential - A5208	Below 75% of AQO	0	Negligible
R5	Residential - A5208	Below 75% of AQO	0	Negligible
R6	Residential - A5208	Below 75% of AQO	0	Negligible
R7	Residential - A580	103 - 109% of AQO	0	Negligible
R8	Residential - A580	76 - 94% of AQO	0	Negligible
R9	Residential - A580	Below 75% of AQO	0	Negligible
R10	Residential - A580	76 - 94% of AQO	0	Negligible
R11	Residential - A580	Below 75% of AQO	0	Negligible
R12	Residential - Lower House Lane	Below 75% of AQO	0	Negligible
R13	Residential - Long House Lane	Below 75% of AQO	0	Negligible

5.3.17 As indicated in Table 24, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.18 Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 25.

Table 25 Predicted Impacts - PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Moorgate Road North	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R2	Residential - Moorgate Road North	Below 75% of AQO	0	Negligible
R3	Education - Park Brow Community Primary School	Below 75% of AQO	0	Negligible
R4	Residential - A5208	Below 75% of AQO	0	Negligible
R5	Residential - A5208	Below 75% of AQO	0	Negligible
R6	Residential - A5208	Below 75% of AQO	0	Negligible
R7	Residential - A580	Below 75% of AQO	0	Negligible
R8	Residential - A580	Below 75% of AQO	0	Negligible
R9	Residential - A580	Below 75% of AQO	0	Negligible
R10	Residential - A580	Below 75% of AQO	0	Negligible
R11	Residential - A580	Below 75% of AQO	0	Negligible
R12	Residential - Lower House Lane	Below 75% of AQO	0	Negligible
R13	Residential - Long House Lane	Below 75% of AQO	0	Negligible

5.3.19 As indicated in Table 25, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.20 Predicted impacts on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 26.

Table 26 Predicted Impacts - PM_{2.5}

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of AQLV (%)	Impact Significance
R1	Residential - Moorgate Road North	Below 75% of AQLV	0	Negligible
R2	Residential - Moorgate Road North	Below 75% of AQLV	0	Negligible
R3	Education - Park Brow Community Primary School	Below 75% of AQLV	0	Negligible

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of AQLV (%)	Impact Significance
R4	Residential - A5208	Below 75% of AQLV	0	Negligible
R5	Residential - A5208	Below 75% of AQLV	0	Negligible
R6	Residential - A5208	Below 75% of AQLV	0	Negligible
R7	Residential - A580	Below 75% of AQLV	0	Negligible
R8	Residential - A580	Below 75% of AQLV	0	Negligible
R9	Residential - A580	Below 75% of AQLV	0	Negligible
R10	Residential - A580	Below 75% of AQLV	0	Negligible
R11	Residential - A580	Below 75% of AQLV	0	Negligible
R12	Residential - Lower House Lane	Below 75% of AQLV	0	Negligible
R13	Residential - Long House Lane	Below 75% of AQLV	0	Negligible

5.3.21 As indicated in Table 26, impacts on annual mean PM_{2.5} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

Overall Impact Significance

5.3.22 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impacts at discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 27.

Table 27 Overall Road Vehicle Exhaust Emissions Impact Significance

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO₂ concentrations were above the relevant AQO at one receptor and below at 12 locations in the DM scenario Predicted annual mean PM₁₀ and PM_{2.5} concentrations were below the relevant AQO and AQLV at all sensitive locations in the DM scenario It is considered unlikely that future air quality conditions will change significantly in the absence of the development given the relatively established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs or AQLV
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	The assessment assumed that vehicle exhaust emission rates and background pollution levels will not reduce in future years. This provides worst-case results when compared with the DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

5.3.23 The IAQM guidance¹⁷ states that only if the impact is greater than **slight**, the effect is considered **significant**. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

¹⁷ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.0 CONCLUSION

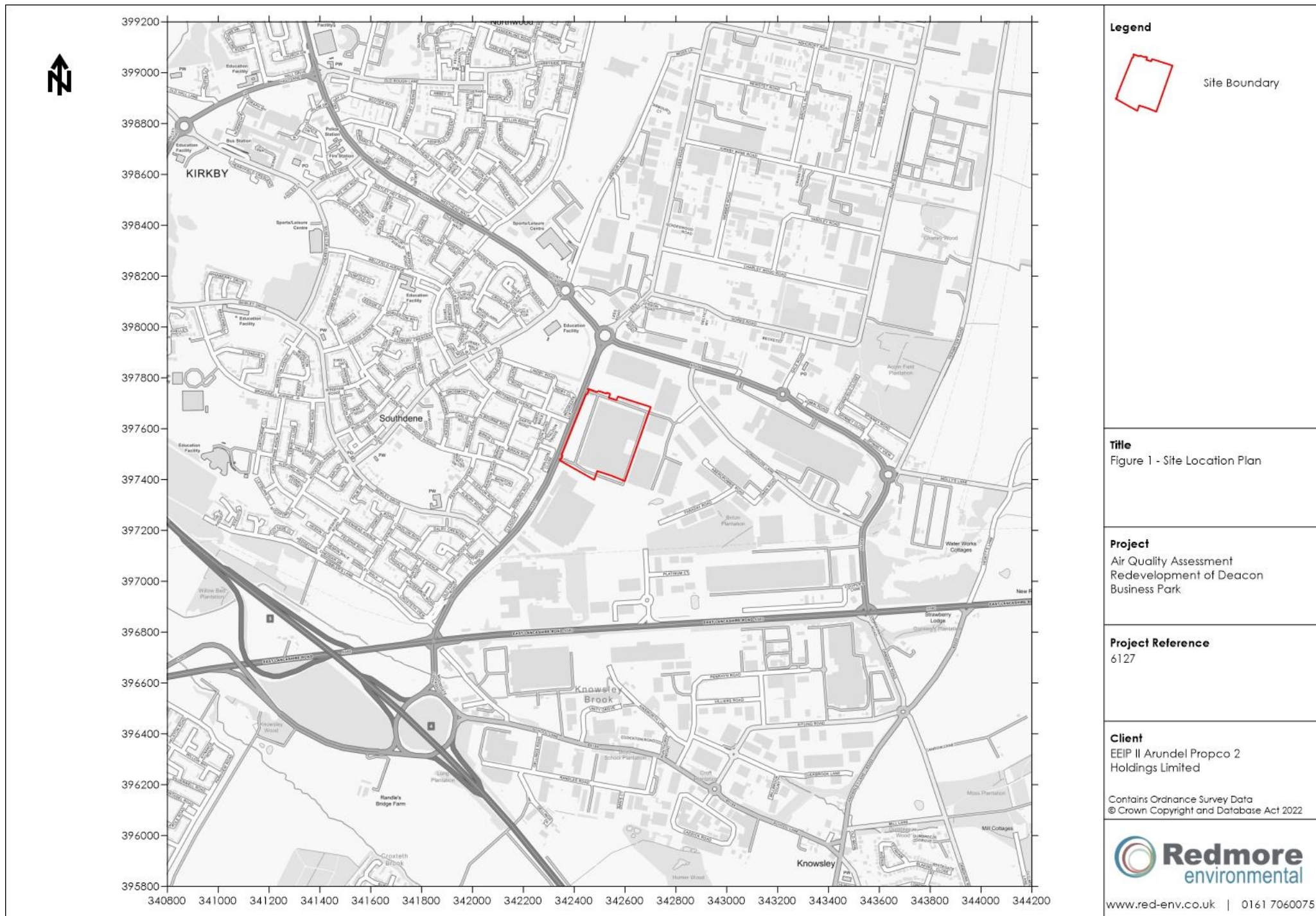
- 6.1.1 Redmore Environmental Ltd was commissioned by EEIP II Arundel Propco Holdings Limited to undertake an Air Quality Assessment in support of a commercial development on land at Deacon Business Park, off Moorgate Road North, Knowsley.
- 6.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.
- 6.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities was predicted to be **not significant**.
- 6.1.4 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the development in place. Results were subsequently verified using local monitoring data.
- 6.1.5 Review of the dispersion modelling results indicated that impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations as a result of traffic generated by the development were predicted to be **negligible** at all sensitive receptor locations. Following consideration of the relevant issues, air quality impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.
- 6.1.6 Based on the assessment results, air quality factors are not considered a constraint to the development.

7.0 **ABBREVIATIONS**

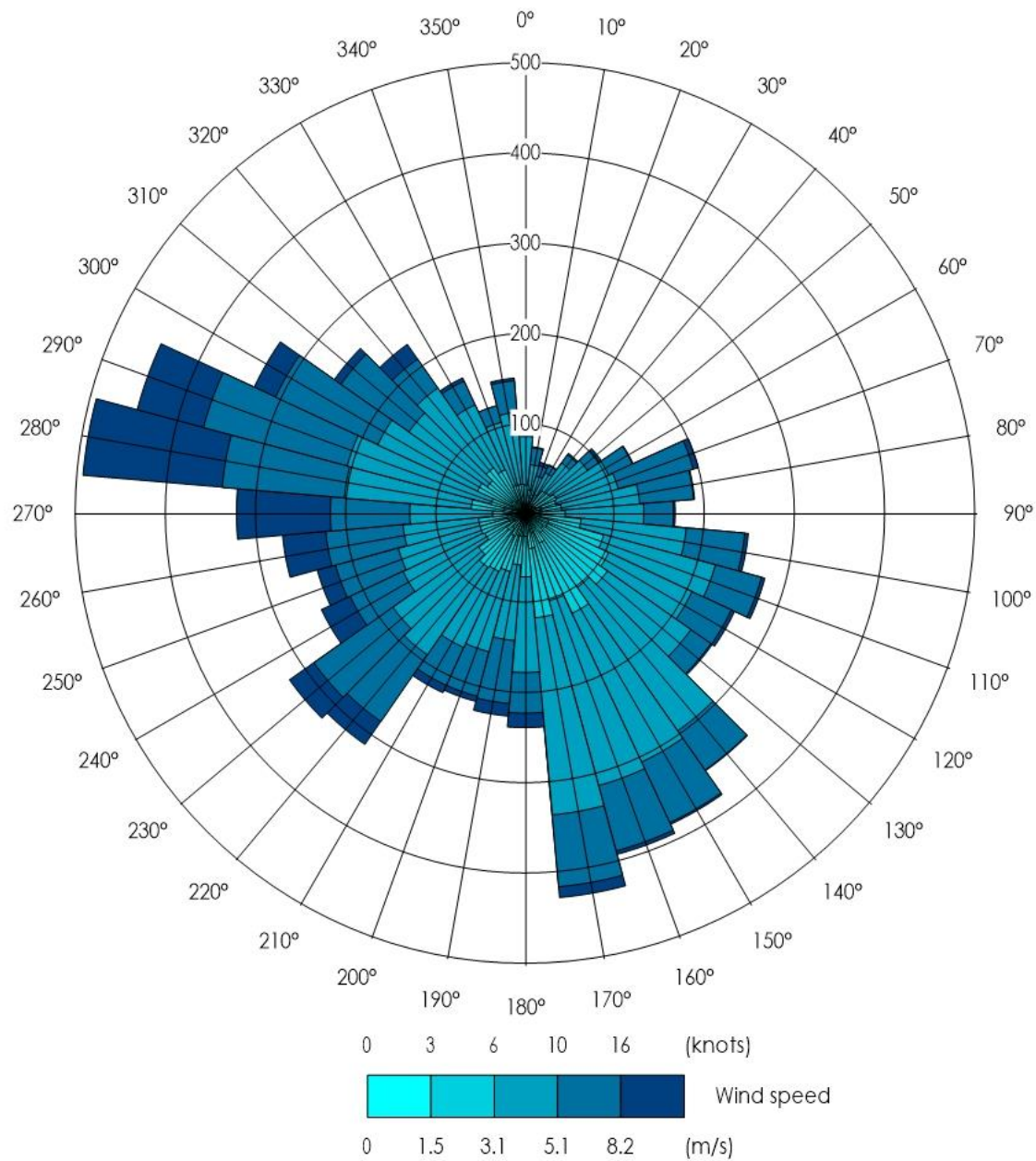
AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
CEMP	Construction Environmental Management Plan
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DPD	Development Plan Document
DS	Do-Something
EB	Eastbound
EFT	Emission Factor Toolkit
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
KMBC	Knowsley Borough Council
LA	Local Authority
LAQM	Local Air Quality Management
LCC	Liverpool City Council
NB	Northbound
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
SB	Southbound
SP	Slow Phase
UDP	

WB	Westbound
Z0	Roughness length

Figures







Legend

Title

Figure 3 - Wind Rose of 2019
Liverpool Airport Meteorological
Data

Project

Air Quality Assessment
Redevelopment of Deacon
Business Park

Project Reference

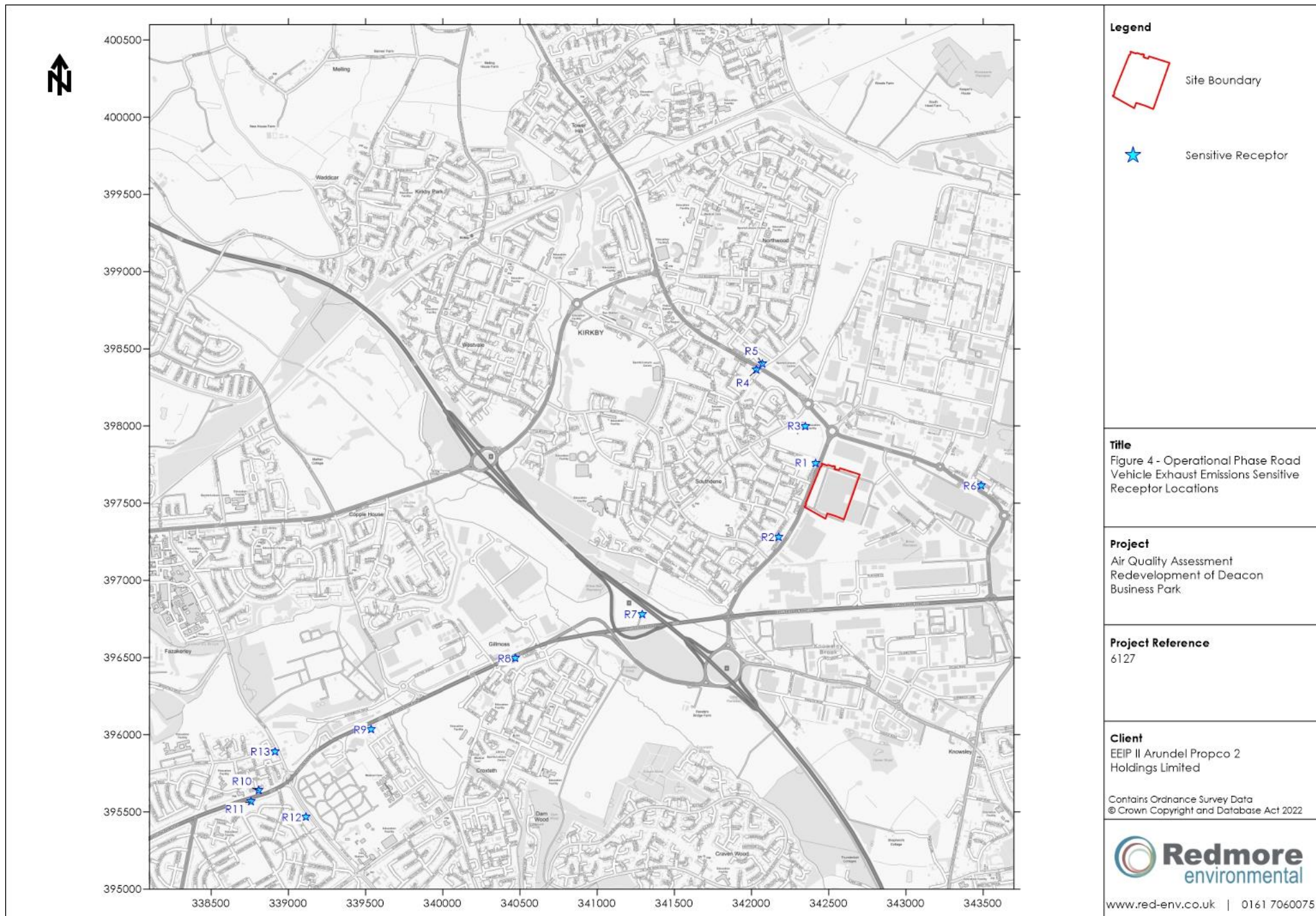
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Client

EEIP II Arundel Propco 2
Holdings Limited



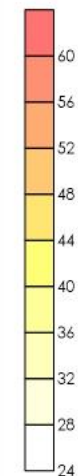
www.red-env.co.uk | 0161 7060075







Legend



Annual Mean NO₂
Concentrations (µg/m³)

Title

Figure 6 - Predicted Annual Mean
NO₂ Concentrations (µg/m³)
Do-Something

Project

Air Quality Assessment
Redevelopment of Deacon
Business Park

Project Reference

6127

Client

EEIP II Arundel Propco 2
Holdings Limited

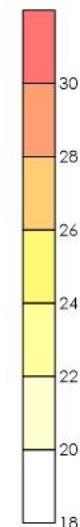
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Legend



Annual Mean PM₁₀
Concentrations
(µg/m³)

Title

Figure 7 - Predicted Annual Mean
PM₁₀ Concentrations (µg/m³)
Do-Minimum

Project

Air Quality Assessment
Redevelopment of Deacon
Business Park

Project Reference

6127

Client

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Holdings Limited

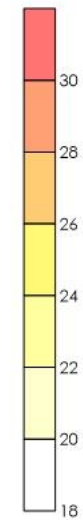
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Legend



Annual Mean PM₁₀
Concentrations
(µg/m³)

Title

Figure 8 - Predicted Annual Mean
PM₁₀ Concentrations (µg/m³)
Do-Something

Project

Air Quality Assessment
Redevelopment of Deacon
Business Park

Project Reference

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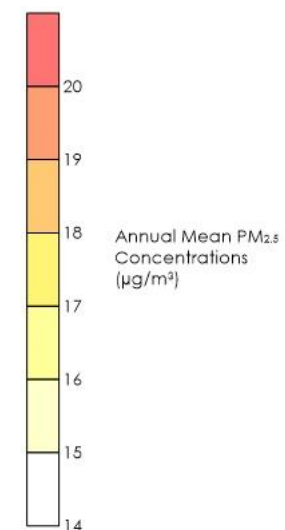


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Legend



Title

Figure 10 - Predicted Annual Mean PM_{2.5} Concentrations (µg/m³)
Do-Something

Project

Air Quality Assessment
Redevelopment of Deacon
Business Park

Project Reference

6127

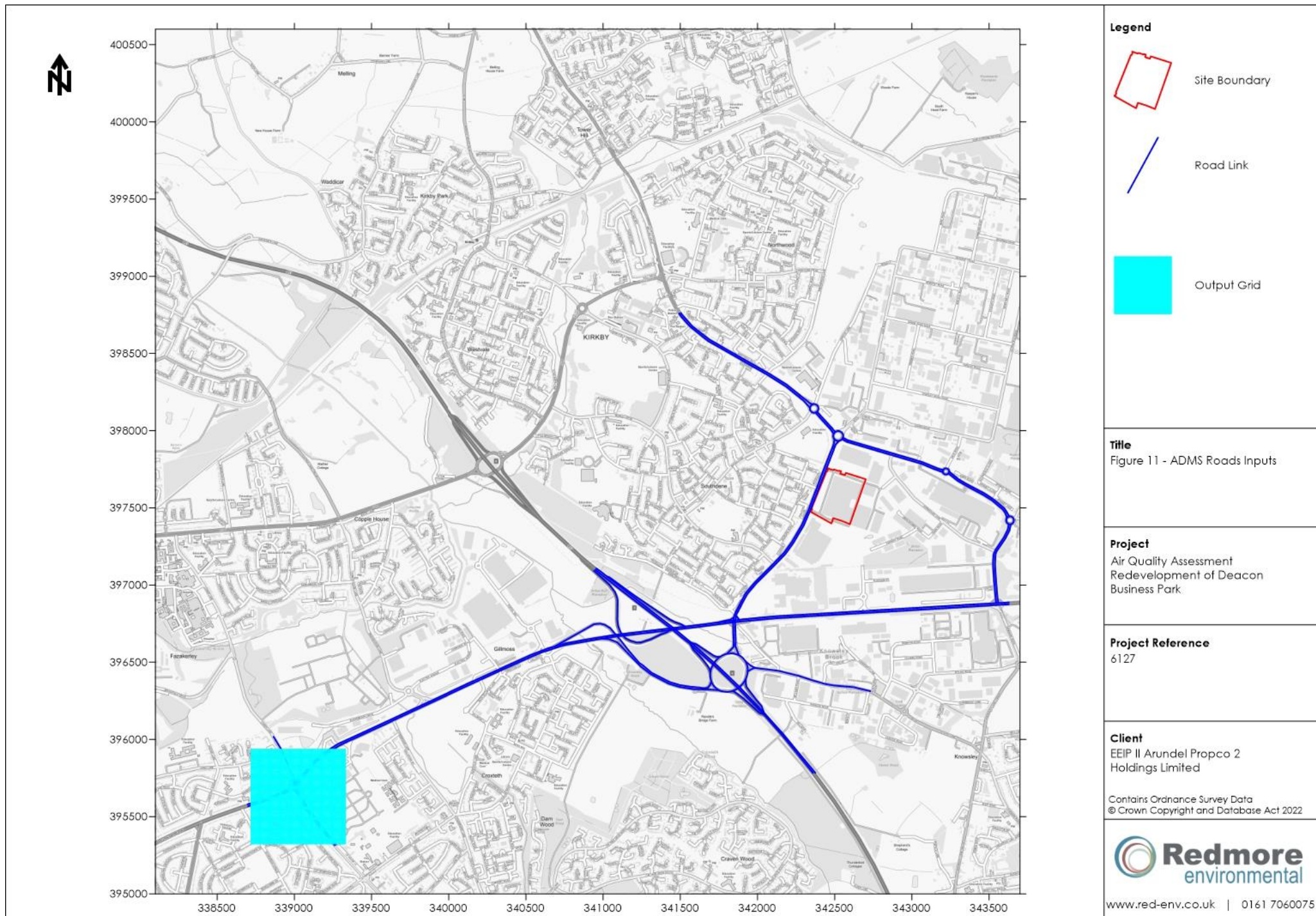
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Appendix 1 - Assessment Input Data

Introduction

The proposed development has the potential to cause air quality impacts as a result of exhaust emissions associated with vehicles travelling to and from the site. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.1.3). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

Additional options can also be selected within the ADMS-Roads user interface in order to take account of site specific characteristic that may affect model outputs, such as canyons.

The relevant inputs are detailed in the following Sections.

Traffic Flow Data

Traffic data for use in this assessment was obtained from the Department for Transport (DfT)¹⁸. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and

¹⁸ <https://roadtraffic.dft.gov.uk/#16/53.9024/-1.6338/basemap-countpoints>.

motorway network, as well as selected minor roads, in Great Britain for the years 1999 to 2021. It should be noted that the DfT web tool is referenced in DEFRA guidance¹⁹ as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

The baseline traffic data was converted to the site opening year utilising a factor obtained from TEMPro (version 7.2). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

Development trip generation and associated distribution was provided by Eddisons, the Transport Consultants for the project. These were added to the relevant links to provide an estimation of traffic flows with the development in place.

A summary of the traffic flow data is provided in Table A1.1. Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards.

Table A1.1 Traffic Data

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		Avg. Vehicle Speed (km/h)	Road Width (m)
		Verif	2025 DM	2025 DS	Verif & 2025 DM	2025 DS		
L1	Moorgate Road north of site southbound (SB)	9,256	9,911	9,710	13.08	13.34	60	7.3
L2	Moorgate Road north of site SB slow phase (SP)	9,256	9,911	9,710	13.08	13.34	25	6.8
L3	Moorgate road north of site northbound (NB)	9,994	10,702	10,501	12.66	12.89	60	6.5
L4	Moorgate Road north of site NB SP	9,994	10,702	10,501	12.66	12.89	25	6.9
L5	Moorgate Road south of site NB	9,994	10,702	10,598	12.66	14.64	60	7.2
L6	Moorgate Road south of site SB	9,256	9,911	9,808	13.08	15.22	60	7.9
L7	Moorgate Road south of site NB SP	9,994	10,702	10,598	12.66	14.64	25	5.2

¹⁹ Local Air Quality Management (TG22) Technical Guidance, DEFRA, 2022.

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		Avg. Vehicle Speed (km/h)	Road Width (m)
		Verif	2025 DM	2025 DS	Verif & 2025 DM	2025 DS		
L8	Moorgate Road south of site SB SP	9,256	9,911	9,808	13.08	15.22	25	5.2
L9	A580 east of Moorgate Road EB	8,234	8,817	8,781	10.24	10.72	80	5.9
L10	A580 east of Moorgate Road WB	7,762	8,312	8,276	8.71	9.22	80	9.0
L11	A580 between Moorgate Road and Lower House Lane WB	12,460	13,342	13,296	5.96	6.19	80	9.3
L12	A580 west of Lower House Lane junction WB	19,446	20,823	20,777	6.13	6.29	60	9.1
L13	A580 between Moorgate Road and Lower House Lane EB	11,211	12,005	11,959	6.82	7.09	60	9.2
L14	A580 west of Lower House Lane junction EB	19,924	21,335	21,289	6.63	6.78	60	8.5
L15	Lower Lane	14,939	15,997	15,997	1.87	1.87	45	9.2
L16	Lower Lane NB SP	7,867	8,424	8,424	1.77	1.77	20	6.3
L17	A580 EB exit slip road onto Lower Lane	7,867	8,424	8,424	1.77	1.77	20	5.3
L18	Lower Lane entrance slip road onto A580 EB	7,072	7,573	7,573	1.98	1.98	20	5.2
L19	Lower Lane SB SP	7,072	7,573	7,573	1.98	1.98	20	18.5
L20	Lower House Lane NB SP	7,867	8,424	8,408	1.77	1.89	20	13.5
L21	Lower House Lane SB SP	7,072	7,573	7,557	1.98	2.12	20	7.0
L22	Lower House Lane NB	7,867	8,424	8,408	1.77	1.89	45	7.8
L23	Lower House Lane SB	7,072	7,573	7,557	1.98	2.12	45	10.3
L24	A580 between roundabout (RB) and East Lancashire Road EB	8,670	9,284	9,284	11.16	11.16	80	9.0
L25	A580 between RB and East Lancashire Road WB	8,447	9,045	9,045	11.26	11.26	80	7.8
L26	A580 EB RB SP	8,670	9,284	9,284	11.16	11.16	25	8.5
L27	A580 WB RB SP	8,447	9,045	9,045	11.26	11.26	25	7.4

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		Avg. Vehicle Speed (km/h)	Road Width (m)
		Verif	2025 DM	2025 DS	Verif & 2025 DM	2025 DS		
L28	M57 NB exit slip road RB SP	9,225	9,878	9,867	26.38	27.06	25	7.2
L29	M57 SB entrance slip road RB SP	8,855	9,482	9,470	28.90	29.60	25	6.1
L30	M57 NB exit slip road	9,225	9,878	9,867	26.38	27.06	60	7.0
L31	M57 NB south of exit slip road	50,095	53,642	53,630	7.89	8.01	110	9.2
L32	M57 NB between slip road	27,675	29,634	29,634	8.79	8.79	110	9.2
L33	M57 NB north of entrance slip road	36,900	39,513	39,501	6.60	6.76	110	13.4
L34	M57 SB south of entrance slip road	49,426	52,925	52,914	8.26	8.38	110	12.4
L35	M57 SB between slip roads	26,565	28,446	28,446	9.63	9.63	110	11.3
L36	M57 SB north of exit slip road	35,420	37,928	37,916	7.22	7.39	110	11.8
L37	M57 NB entrance slip road	9,225	9,878	9,867	26.38	27.06	110	6.5
L38	M57 SB exit slip road	8,855	9,482	9,470	28.90	29.60	60	6.6
L39	B5194 School Lane	7,367	7,889	7,889	9.35	9.35	60	7.7
L40	School Lane WB SP	3,692	3,953	3,953	8.45	8.45	25	8.2
L41	School Lane EB SP	3,675	3,935	3,935	10.26	10.26	25	7.4
L42	Moorgate Road south NB RB SP	6,407	6,861	6,838	17.15	19.07	25	5.4
L43	Moorgate Road south NB	6,407	6,861	6,838	17.15	19.07	60	7.2
L44	Moorgate Road south NB junction SP	6,407	6,861	6,838	17.15	19.07	25	5.0
L45	Moorgate Road south SB RB SP	6,551	7,015	6,992	14.72	16.58	25	9.8
L46	Moorgate Road south SB	6,551	7,015	6,992	14.72	16.58	60	7.5
L47	Moorgate Road south SB junction SP	6,551	7,015	6,992	14.72	16.58	25	6.8
L48	A5208 between Gale Road and Moorgate Road NB	4,763	5,100	5,100	8.38	8.38	60	7.5

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		Avg. Vehicle Speed (km/h)	Road Width (m)
		Verif	2025 DM	2025 DS	Verif & 2025 DM	2025 DS		
L49	A5208 between Gale Road and Moorgate Road NB SP	4,763	5,100	5,100	8.38	8.38	25	6.2
L50	A5208 between Gale Road and Moorgate Road SB	4,083	4,372	4,372	9.04	9.04	60	6.6
L51	A5208 between Gale Road and Moorgate Road SB SP	4,083	4,372	4,372	9.04	9.04	25	7.2
L52	A5208 between Lees Road and Broad Lane WB SP	5,338	5,716	5,515	4.65	4.80	25	7.0
L53	A5208 between Lees Road and Broad Lane WB	5,338	5,716	5,515	4.65	4.80	60	7.6
L54	A5208 between Lees Road and Broad Lane WB approach RB SP	5,338	5,716	5,515	4.65	4.80	25	9.0
L55	A5208 between Lees Road and Broad Lane EB approach RB SP	4,843	5,186	4,985	4.40	4.56	25	7.3
L56	A5208 between Lees Road and Broad Lane EB	4,843	5,186	4,985	4.40	4.56	60	6.6
L57	A5208 between Lees Road and Broad Lane EB SP	4,843	5,186	4,985	4.40	4.56	25	8.5
L58	A5208 west of Broad Lane WB SP	5,338	5,716	5,515	4.65	4.80	25	9.6
L59	A5208 west of Broad Lane WB	5,338	5,716	5,515	4.65	4.80	60	7.1
L60	A5208 west of Broad Lane EB SP	4,843	5,186	4,985	4.40	4.56	25	7.9
L61	A5208 west of Broad Lane EB	4,843	5,186	4,985	4.40	4.56	60	6.6
L62	Lower House Lane slip road on to A580	7,867	8,424	8,408	1.77	1.89	25	6.1
L63	A580 slip road on to Lower House Lane	7,072	7,573	7,557	1.98	2.12	25	5.8
L64	M57 slip road on to A580	8,670	9,284	9,284	2.79	2.79	80	6.1
L65	A580 slip road on to M57	13,987	14,977	14,977	2.06	2.06	110	7.2
L66	A5208 between Gale Road and Perimeter Road WB	4,763	5,100	5,100	8.38	8.38	60	6.8

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		Avg. Vehicle Speed (km/h)	Road Width (m)
		Verif	2025 DM	2025 DS	Verif & 2025 DM	2025 DS		
L67	A5208 between Gale Road and Perimeter Road EB	4,083	4,372	4,372	9.04	9.04	60	6.8
L68	A5208 between Molly's Lane and A580 NB	4,763	5,100	5,100	8.38	8.38	60	7.9
L69	A5208 between Molly's Lane and A580 SB	4,083	4,372	4,372	9.04	9.04	60	7.2
R1	M57 RB	7,360	7,881	7,858	34.77	36.49	25	9.6
R2	Moorgate Road/ A5208 RB	6,380	6,831	6,630	19.83	20.42	25	9.3
R3	A5208/ Broad Lane RB	5,214	5,583	5,382	4.76	4.92	25	11.2
R4	Gale Road/ A5208 RB	4,423	4,736	4,736	9.02	9.02	25	8.5
R5	Molly's Lane/ A5208 RB	4,423	4,736	4,736	9.02	9.02	25	10.1

Reference should be made to Figure 11 for a graphical representation of the road link locations.

Emission Factors

Emission factors were calculated using the relevant traffic flows and the Emission Factor Toolkit (EFT) (version 11.0). This has been produced by DEFRA and incorporates COPERT 5.3 vehicle emission factors and fleet information.

There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2019 emission factors were utilised in preference to the scheme opening year in order to provide robust model outputs. As predictions for 2019 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Liverpool Airport meteorological station over the period 1st January 2019 to 31st December 2019 (inclusive). Liverpool Airport is

located at NGR: 343488, 381791 which is approximately 15.9km south-east of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 3 for a wind rose of utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

A z_0 of 0.1m was used to describe the meteorological site. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'root crops'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents and the meteorological site. This is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'mixed urban/industrial'.

Background Concentrations

Background NO₂, PM₁₀ and PM_{2.5} concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 13.

Background concentrations from 2019 were utilised throughout the assessment in preference to the development opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance²⁰.

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of the assessment, model verification was undertaken for 2019 using traffic data, meteorological data and monitoring results from this year. The choice of 2019 as the verification year aligns with the IAQM position statement 'Use of 2020 and 2021 Monitoring Datasets'²¹, which states:

"If you are carrying out an air quality study that includes validation against monitoring data, use 2019 monitoring data as the last typical year."

Monitoring of NO₂ concentrations was undertaken at two locations within the vicinity of roads included within the model during 2019. The results were obtained and the road contribution to total NO_x concentration calculated following the methodology contained within DEFRA

²⁰ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

²¹ Use of 2020 and 2021 Monitoring Datasets, IAQM, 2021.

guidance²². The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A1.3.

Table A1.3 Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
K7	LC067 Corner of Country Road and Webster	29.6	23.12
K10	Outside 19 Moorgate Road (A5207)	29.4	22.71

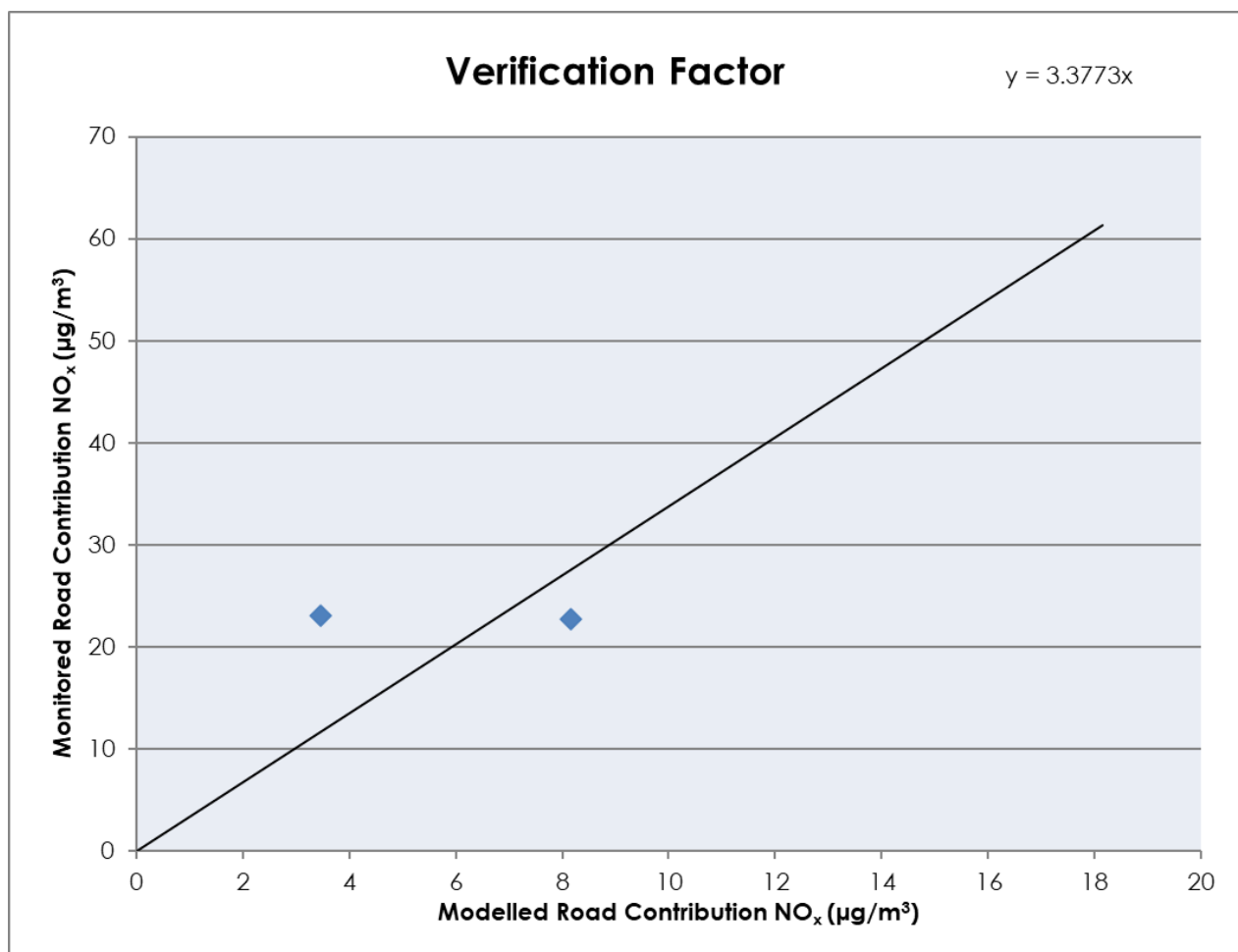
The annual mean road NO_x concentrations predicted from the dispersion model and the 2019 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.5.

Table A1.5 Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
K7	LC067 Corner of Country Road and Webster	23.12	3.46
K10	Outside 19 Moorgate Road (A5207)	22.71	8.16

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 3.3773 was required to be applied to all monitoring results, as shown in Graph 1.

²² Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Graph 1 NO_x Verification Factor

Monitoring of PM₁₀ and PM_{2.5} concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust model predictions of these species in lieu of more accurate data in accordance with DEFRA guidance²³.

²³ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Appendix 2 - Curricula Vitae

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-5, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

SELECT PROJECTS SUMMARY:

Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.