

AIR QUALITY ASSESSMENT

Proposed Residential Development

Waterfold Mill, Heap Bridge

Issue Date: 05 August 2025

QUALITY ASSURANCE & REPORT INFORMATION

Report Version	R1	R2	R3	R4
Prepared by	John Goodwin MIOA			
Position	Director			
Reviewed by	Martyn Parker MIOA			
Position	Principal Consultant			
Issue Date	27 June 2024			
Comments	First issue			

Project: Proposed Residential Development

Client: John Stephens & Co

Reference: 23.152.2.R1

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Professional Consult Limited is registered in England (11635570). Registered Office: 534 Edenfield Road, Rochdale, Lancashire OL12 7QJ

Professional Consult Limited

hello@professionalconsult.co.uk
www.professionalconsult.co.uk



EXECUTIVE SUMMARY

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of 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. These were assessed against the relevant screening criteria. Due to the low number of vehicles trips generated by the proposals, impacts were not predicted to be significant.

The proposal has the potential to expose future occupants to elevated pollution levels. Dispersion modelling was therefore undertaken in order to predict concentrations across the site as a result of emissions from the highway network. Results were subsequently verified using local monitoring data.

The results of the dispersion modelling assessment indicated that predicted pollutant concentrations were below the relevant criteria at the building façade. As such, the site is considered suitable for the proposed end use from an air quality perspective and mitigation is not required.

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

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1.1 Background

- 1.1.1 Professional Consult Limited, working with our approved associate consultant Redmore Environmental Ltd, was instructed by John Stephens & Co, to prepare an Air Quality Assessment to support the planning application for a residential development on land off Waterfold Lane, Heywood.
- 1.1.2 The proposals have the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future occupants to elevated pollution levels. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider location suitability 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 off Waterfold Lane, Heywood, at approximate National Grid Reference (NGR): 382110, 410345. Reference should be made to Figure 1 for a map of the site and surrounding area.
- 1.2.2 The proposals comprise the construction of 30 apartments with associated landscaping and parking.
- 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. There is also the potential for exposure of future residents to elevated polluted concentrations due to the proximity of the M66 and associated road vehicle emissions. An Air Quality Assessment was therefore undertaken in order to determine baseline and assess potential effects as a result of the proposals. This is detailed in the following report.
- 1.2.4 All acronyms used within this report are defined in the Glossary presented in Appendix 1.

1.3 Confidentiality

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2 LEGISLATION & GUIDANCE

2.1 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 were also 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 on 28th April 2023¹. 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 The Environmental Improvement Plan 2023² was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to PM_{2.5}. The Concentration Target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

2.1.5 Table 1 presents the AQOs, Interim Target and Concentration Target for pollutants considered within this assessment.

Table 1. Air Quality Objectives/Interim Target/Concentration Target

Pollutant	Air Quality Objective/Interim Target/Concentration Target	
	Concentration (µg/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

¹ AQS: Framework for Local Authority Delivery, DEFRA, 2023.

² Environmental Improvement Plan 2023, DEFRA, 2023.

Pollutant	Air Quality Objective/Interim Target/Concentration Target	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum 50
PM _{2.5}	12 ^(a)	Annual mean
	10 ^(b)	Annual mean

Note: (a) Interim Target to be achieved by end of January 2028.

(b) Concentration Target to be achieved by 2040.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance³ 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
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 (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

³ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

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 Framework⁴ (NPPF) was published in December 2024 and amended in February 2025. The document 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 [...]"

- 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."

⁴ NPPF, Ministry of Housing, Communities and Local Government, 2024.

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 Guidance⁵ (NPPG) web-based resource was launched by the Department for Communities and Local Government 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?

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

2.6 Regional Planning Policy

2.6.1 The 'Places for Everyone Joint Development Plan Document'⁶ was adopted by the Greater Manchester Combined Authority (GMCA) on 21st March 2024. Review of the document indicated the following policies of relevance to this assessment:

"Policy JP-P1: Sustainable Places

We aim to become one of the most liveable city regions in the world, consisting of a series of beautiful, healthy and varied places, each having the following key attributes that all development, wherever appropriate, should be consistent with:

[...]

15. Comfortable and inviting, with indoor and outdoor environments:

A. Offering a high level of amenity that minimizes exposure to pollution; [...]"

"Policy JP-S5: Clean Air

A comprehensive range of measures will be taken to support improvements in air quality, focusing particularly on locations where people live, where children learn and play, where there are impacts on the green infrastructure network and where air quality targets are not being met, including:

- 1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;*
- 2. Determining planning applications having regard to the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;*

⁵ <https://www.gov.uk/guidance/air-quality--3>.

⁶ Places for Everyone Joint Development Plan Document, GMCA, 2024.

3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data so that adverse impacts on air quality can be fully assessed and development only permitted where they are acceptable and/or suitable mitigation can be provided;
4. Restricting developments that would generate significant point source pollution such as some types of industrial activity and energy generation;
5. Significantly expanding the existing commercial network of electric vehicle charging points, both for public and private use, including as part of new developments;
6. Implementing the Clean Air Plan and associated measures;
7. Facilitating the more sustainable distribution of goods within the urban area, including through accommodating urban consolidation centres and urban distribution centres that use ultra-low-emission vehicles, and local delivery facilities to reduce repeat delivery attempts;
8. Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees;
9. Controlling traffic and parking within and around schools, early years sites and other locations that are particularly sensitive to air quality;
10. Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants; and
11. Development should be located in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users."

2.6.2 The above policies were taken into consideration throughout the undertaking of the assessment.

2.7 Local Planning Policy

2.7.1 The Core Strategy 2016 - 2028⁷ was adopted by Rochdale Borough Council (RBC) in October 2016 and is a key document in the Rochdale Local Plan. It sets out the strategic planning framework for the borough's future development needs up to 2028. Review of the document indicated the following policies of relevance to the assessment:

"Policy G9 - Reducing the Impact of Pollution, Contamination and Land Instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

- a. Focusing on measures that reduce air pollution in Air Quality Management Areas, and other areas where pollution levels are unacceptable, particularly around motorways and main roads;*
- b) Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution*
- c) Ensuring sensitive new developments such as housing, schools and hospitals are not adversely affected by existing sources of pollution such as roads and certain types of industry;*
- d) Requiring a Low Emissions Strategy where development requires a Transport Assessment, and in other circumstances as appropriate.*

[...]

g. Using planning conditions or obligations to control pollution from new development, or the impact of pollution on new development."

"Policy DM1 - General Development Requirements

⁷ Core Strategy 2016 - 2028, RBC, 2016.

All development proposals, including changes of use of land and buildings, extensions and alterations, will be expected to demonstrate that they:

[...]

d. Mitigate against any impacts due to noise, air, dust, light and odour pollution, traffic generation or inadequate access, where such mitigation is identified as being necessary;

[...]

f. Do not have an adverse impact on health, through its impact or the effect of existing problems e.g. land contamination, or poor air quality;

[...]."

"DM2 - Delivering Planning Contributions and Infrastructure

[...]

3. All types of development

For all types of development, including housing, we will seek contributions for any infrastructure or other measures necessary to mitigate any on site or off-site impacts from the development.

These contributions may cover, dependent on need:

[...]

Mitigation or compensation against environmental impacts e.g. noise, air quality (particularly in Air Quality Management Areas);

[...]."

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

2.8 Greater Manchester Clean Air Plan

2.8.1 The UK Government has instructed a number of LAs to take rapid action to reduce harmful roadside levels of NO₂ within their areas of jurisdiction in the quickest possible timeframe. The GMCA and Transport for Greater Manchester (TfGM) have collaborated to develop a Clean Air Plan (CAP) to ensure Greater Manchester achieves compliance with the relevant AQOs for NO₂ by 2026 at the latest. The initial CAP proposal included implementation of a Class C charging Clean Air Zone. The GMCA subsequently updated the CAP proposals⁸ to comprise an investment-led, non-charging approach. This was approved by the UK Government on 23rd January 2025. The implications of the CAP were taken into account during the undertaking of this assessment.

⁸ Case for a New GM Clean Air Plan, GMCA and TfGM, 2022.

3 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases, as well as expose future residents to elevated pollution levels. These factors have been assessed in accordance with the following methodology.

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 V2.2'⁹.

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

- 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;
- The risk of health effects due to a significant increase in exposure to PM₁₀.

3.2.4 The assessment steps are detailed below.

Step 1

3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m from the boundary or 50m from the construction vehicle route up to 250m 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 250m 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);

⁹ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

- 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	Earthworks	• Total site area greater than 110,000m² • 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 6m in height
	Construction	• Total building volume greater than 75,000m³ • 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	Earthworks	• Total site area 18,000m² to 110,000m² • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 3m to 6m in height
	Construction	• Total building volume 12,000m³ to 75,000m³ • 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	Earthworks	• Total site area less than 18,000m² • 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 6m in height
	Construction	• Total building volume less than 12,000m³ • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 20 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 sensitivities of specific receptors are shown in Table 4.

Table 4. Construction Dust - Sensitivities of Human and Ecological Receptors

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 expect to enjoy a reasonable level of amenity - Aesthetic 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
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, shopping streets, playing fields, farmland, short term car parks and roads	Locally designated site e.g. Local Nature Reserve

3.2.11 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 250
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.12 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 250
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	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 250
	28 - 32µg/m ³	1 - 10	High	Medium	Low	Low
		More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
	24 - 28µg/m ³	1 - 10	High	Medium	Low	Low
		More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
	Less than 24µg/m ³	1 - 10	Medium	Low	Low	Low
		More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
	Greater than 32µg/m ³	1 - 10	Low	Low	Low	Low
		More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
Medium	Greater than 32µg/m ³	More than 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 10	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low

3.2.13 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

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

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

3.2.15 Table 8 outlines the risk category from earthworks, construction and trackout activities.

Table 8. Construction Dust - Dust Risk Category from Earthworks, Construction and Trackout Activities

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

Step 3

3.2.16 Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance¹⁰ 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

3.2.17 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**.

3.3 Operational Phase Assessment

Potential Development Impacts

3.3.1 The development has the potential to increase concentrations of NO₂, PM₁₀ and PM_{2.5} as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality' guidance to determine the potential for trips generated by the development to affect local air quality.

3.3.2 The following criteria are provided to help establish when an assessment of potential road traffic impacts on the local area is likely to be considered necessary:

¹⁰

Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

A. If any of the following apply:

- 10 or more residential units or a site area of more than 0.5ha; or,
- More than 1,000m² of floor space for all other uses or a site area greater than 1ha.

B. Coupled with any of the following:

- The development has more than 10 parking spaces; or,
- The development will have a centralised energy facility or other centralised combustion process.

3.3.3 Should these criteria not be met, then the IAQM guidance¹¹ considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

3.3.4 Where the above criteria are met, then the assessor should proceed to assess the development proposals against the following Stage 2 screening criteria:

- ② The development leads to a change of Light Duty Vehicle (LDV) flows of:
 - ② More than 100 Annual Average Daily Traffic (AADT) within an AQMA;
 - ② More than 500 AADT outside of an AQMA;
- ② The development leads to a change of HDV flows of:
 - ② More than 25 AADT within an AQMA;
 - ② More than 100 AADT outside of an AQMA;
- ② Introduce a new junction that would cause traffic flow to change behaviour with respect to acceleration/deceleration or introduce queueing traffic where there previously wasn't any (such as a roundabout or traffic lights); and,
- ② Introduce one or more significant combustion processes where there is a risk of impact to relevant receptors.

3.3.5 Should these criteria not be met, then the IAQM guidance¹² considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

Potential Future Exposure

3.3.6 The proposals have the potential to expose future occupants to elevated pollution levels. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations across the development site, detailed dispersion modelling was undertaken. Reference should be made to Appendix 1 for a full description of the assessment input data.

3.3.7 The dispersion modelling results were compared against the relevant AQOs and Interim Target in order to determine the potential for exposure of future residents to elevated pollutant concentrations and identify any requirement for mitigation.

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

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

4 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), as amended by the Environment Act (2021), RBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO within the city. As such, a number of roads within Rochdale have been included within the Greater Manchester Combined Authority (GMCA) AQMA. This is described as follows:

"This is the part of the Greater Manchester Combined Authority AQMA located within the Rochdale Borough Council area."

4.2.2 The development is partially located within the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area, as well as exposure of future occupants to elevated pollutant concentrations. This has been considered throughout the assessment.

4.2.3 RBC 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 concentrations is undertaken by RBC throughout their area of jurisdiction. Data has also been collected by the GMCA to inform the CAP. Recent NO₂ concentrations recorded in the vicinity of the development, as provided in the 'Greater Manchester LAQM and CAP NO₂ Diffusion Tube Results 2011-2023'¹³ spreadsheet, are shown in Table 9. Exceedences of the relevant AQO are shown in **bold**.

Table 9. Monitoring Results

Monitoring Site	Monitored Annual Mean NO ₂ Concentration (µg/m ³)			
	2020	2021	2022	2023
BU7NO	23.4	24.8	25.9	24.1
BU12NO	35.0	40.9	38.7	38.7
BU13NO	34.0	39.8	36.9	35.0
BU18NO	27.9	30.3	30.3	30.2

4.3.2 As shown in Table 9, annual mean NO₂ concentrations were above the relevant AQO at BU12NO during 2021. As these monitors are roadside positions within an AQMA, elevated results are to be expected. Annual mean NO₂ concentrations were below the AQO of 40µg/m³ at all other monitoring locations within the vicinity of the site in recent years. Reference should be made to Figure 2 for a map of the survey positions.

¹³ Greater Manchester LAQM and CAP NO₂ Diffusion Tube Results 2011-2022, GMCA, 2024.

- 4.3.3 It should be noted that pollutant concentrations recorded during 2020 and 2021 were affected by changes to travel patterns and associated emissions caused by the COVID-19 pandemic. The results should therefore be viewed with caution. However, monitoring data for 2022 and beyond is now considered representative of post-pandemic conditions. This is supported by the IAQM¹⁴, who have adopted the following position:

"ambient air quality monitoring data for the year 2022 and beyond is generally considered to represent the current post-pandemic baseline."

- 4.3.4 RBC does not undertake monitoring of PM₁₀ or PM_{2.5} 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: 382500, 410500. Data for this location was downloaded from the DEFRA website¹⁵ for the purpose of the assessment and is summarised in Table 10.

Table 10. Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2023	2025	2027
NO ₂	14.87	13.67	12.67
PM ₁₀	13.68	13.60	13.51
PM _{2.5}	7.33	7.23	7.15

- 4.4.2 As shown in Table 10, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and Interim Target 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.

- 4.5.2 Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 250m from the development boundary. These are summarised in Table 11.

Table 11. Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	1 - 10	0
Up to 50	1 - 10	0
Up to 100	10 - 100	-
Up to 250	More than 100	-

¹⁴ Use of 2020 and 2021 Monitoring Datasets - IAQM Position Statement V1.1, IAQM, 2023.

¹⁵ <https://uk-air.defra.gov.uk/data/iaqm-background-maps?year=2021>.

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 250m of the site access. These are summarised in Table 12.

Table 12. 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	0
Up to 50	More than 100	0

4.5.4 Dust sensitive receptors within 250m of the site include farmland and residential dwellings. Based on the criteria shown in Table 4, these are considered to be of **low** and **high** sensitivity, respectively. It should be noted that there are only 1 to 10 **low** sensitivity receptors located within 50m of the site boundary.

5 CONSTRUCTION PHASE 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, as well as exposure of future occupants to poor air quality. These are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

- 5.2.1 The undertaking of activities such as 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 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2a - Define the Potential Dust Emission Magnitude

Earthworks

- 5.2.4 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site covers an area of less than 18,000m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

Construction

- 5.2.5 Due to the size of the development the total building volume is likely to be between 12,000m³ and 75,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **medium**.

Trackout

- 5.2.6 Based on the site area, it is anticipated that the unpaved road length is likely to be between 50m to 100m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **medium**.

Step 2b - Define the Sensitivity of the Area

Dust Soiling

- 5.2.7 Table 11 shows that there are between 1 and 10 **low** sensitivity receptors within 20m of the site boundary. The sensitivity of the area with respect to dust soiling from earthworks and construction, as defined using the criteria summarised in Table 5, is therefore considered to be **low**.

- 5.2.8 Table 12 shows that there are more than 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to dust soiling from trackout, as defined using the criteria summarised in Table 5, is therefore considered **high**.

Human Health

- 5.2.9 Table 10 shows the annual mean PM₁₀ background concentration at the site is 13.60µg/m³. As shown in Table 6, where the background annual mean PM₁₀ concentration is below 24µg/m³ and there are between 1 and 10 **low** sensitivity receptors within 20m of the site boundary, the sensitivity of the area with respect to human health from earthworks and construction is considered to be **low**.
- 5.2.10 There are more than 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to human health from trackout, as defined using the criteria summarised in Table 6, is therefore considered to be **medium**.

Step 2c - Define the Risk of Dust Impacts

- 5.2.11 The derived dust emission magnitude for each activity was combined with the sensitivity of the area to determine the risk of unmitigated impacts in line with the methodology set out in Table 8. A summary of the risk from each dust generating activity is provided in Table 13.

Table 13. Summary of Potential Unmitigated Dust Risks

Potential Impact	Activity	Step 2A - Dust Emission Magnitude	Step 2B - Sensitivity of the Area	Step 2C - Risk
Dust Soiling	Earthworks	Small	Low	Negligible
	Construction	Medium	Low	Low
	Trackout	Medium	High	Medium
Human Health	Earthworks	Small	Low	Negligible
	Construction	Medium	Low	Low
	Trackout	Medium	Medium	Medium

- 5.2.12 As indicated in Table 13, the potential risk of dust soiling is **medium** from trackout, **low** from construction and **negligible** from earthworks. The potential risk of human health impacts is **medium** from trackout, **low** from construction and **negligible** from earthworks.
- 5.2.13 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

- 5.2.14 The IAQM guidance¹⁶ 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 14. 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 14. 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 to monitor dust, record inspection results, and make the log available to the LA upon request • 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
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • 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, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used • 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 and materials
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
Trackout	• Use water-assisted dust sweeper on access and local roads, if required • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials • 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 • Access gates to be located at least 10m from receptors where possible

Step 4

- 5.2.15 Assuming the relevant mitigation measures outlined in Table 14 are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁷.

5.3 Operational Phase Assessment

Potential Development Impacts

Stage 1 Screening Criteria

- 5.3.1 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks. The proposals have therefore been assessed against the IAQM¹⁸ Stage 1 screening criteria detailed in Section 3.3. The development includes more than 10 residential units, coupled with more than 10 car parking spaces. As such, the Stage 2 Screening Criteria have been considered below.

Stage 2 Screening Criteria

- 5.3.2 Vehicle trip generation for the scheme was provided by Focus Transport Planning, the Transport Consultants for the scheme. This indicated the development is predicted to produce 151 LDV trips per day.

- 5.3.3 The predicted trips will be distributed along the following two routes:

- 53 LDV trips east along Bury New Road; and,
- 98 LDV trips west along Bury New Road.

- 5.3.4 Based on the above information, the proposal is not predicted to result in a daily increase of LDV flows of more than 500 AADT, or 100 AADT within the AQMA, or HDV flows of more than 100 AADT, or 25 AADT within the AQMA. Additionally, the proposals do not include significant highway realignment or the introduction of a junction. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM¹⁹ screening criteria shown in Section 3.3.

Potential Future Exposure

- 5.3.5 The proposed development has the potential to expose future occupants to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions at the site. Reference should be made to Figures 3, 4 and 5 for graphical representations of predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations.
- 5.3.6 As shown in Figure 3, annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ at the building façade. The maximum level was 35.80µg/m³.
- 5.3.7 As shown in Figure 4, annual mean PM₁₀ concentrations were predicted to be below the AQO of 40µg/m³ at the building façade. The maximum level was 17.56µg/m³.

¹⁷ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

¹⁸ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

¹⁹ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

5.3.8 As shown in Figure 5, annual mean PM_{2.5} concentrations were predicted to be below the Interim Target of 12µg/m³ at the building façade. The maximum level was 9.77µg/m³.

5.3.9 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the relevant AQOs and Interim Target. As such, the site is considered suitable for the proposed use from an air quality perspective.

5.4 Interim Planning Guidance for PM_{2.5}

5.4.1 Interim Planning Guidance²⁰ on the consideration of the PM_{2.5} targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise emissions of PM_{2.5} and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 15, along with the development response.

Table 15. Interim Planning Guidance

Question	Response
How has exposure to PM_{2.5} been considered when selecting the development site? Factors to consider include: - Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these - Site proximity to pollution sources and the impact of these on users of the development - Exposure and emissions during both construction and in-use	The site is located in a residential and urban area, which has residential properties to the east and industrial units to the west. There are no schools, hospitals or care homes within the vicinity of the site. Receptors located along the wider road network have the potential to be affected by exhaust emissions associated with vehicles travelling to and from the site. However, the findings of the assessment, as previously summarised, indicate that impacts on PM_{2.5} concentrations are not considered to be significant The main pollution source of concern is the M66, which is adjacent to the western development boundary. However, as outlined in Section 5.3, PM_{2.5} concentrations at the building façade were predicted to be below the Interim Target As outlined in Table 14, a number of mitigation measures will be used throughout the construction phase in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations
What actions and/or mitigations have been considered to reduce PM_{2.5} exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of PM_{2.5} and its precursors? - Site layout - The development's design - Technology used in the construction or installed for use in the development - Construction and future use of the development	In order to reduce emissions of PM_{2.5} with associated impacts at nearby receptors, the following measures have been included in the proposals: - Provision of Electric Vehicle charging spaces to encourage the use of low emission vehicles - Provision of secure cycle storage to encourage the use of sustainable transport modes to and from the site Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities

5.4.2 Based on the responses provided in Table 16 and the results of the assessment, as outlined in Sections 5.2 and 5.3, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of PM_{2.5}.

6 CONCLUSION

- 6.1.1 Professional Consult Limited, working with our approved associate consultant Redmore Environmental Ltd, was instructed by John Stephens & Co to prepare an Air Quality Assessment to support the planning application for a residential development on land off Waterfold Lane, Heywood.
- 6.1.2 The proposals have the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future residents to elevated pollution levels. 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 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. These were assessed against the relevant screening criteria. Due to the low number of vehicle trips generated by the proposals, impacts were not predicted to be significant.
- 6.1.5 The proposal has the potential to expose future occupants to elevated pollution levels. Dispersion modelling was therefore undertaken in order to predict concentrations across the site as a result of emissions from the highway network. Results were subsequently verified using local monitoring data.
- 6.1.6 The results of the dispersion modelling assessment also indicated that NO₂, PM₁₀ and PM_{2.5} concentrations were predicted to be below the relevant AQOs and Interim Target at the building façade. As such, the site is considered suitable for the proposed use from an air quality perspective.
- 6.1.7 Based on the assessment results, air quality factors are not considered a constraint to the development.

APPENDIX 1: GLOSSARY

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQAP	Air Quality Action Plan
AQO	Air Quality Objective
AQS	Air Quality Strategy
CAP	Clean Air Plan
CEMP	Construction Environmental Management Plan
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EB	Eastbound
EV	Electric Vehicle
GMCA	Greater Manchester Combined Authority
TfGM	Transport for Greater Manchester
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
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
RBC	Rochdale Borough Council
SB	Southbound
SP	Slow Phase
SPD	Supplementary Planning Document
WB	Westbound
Z ₀	Roughness Length

APPENDIX 2: ASSESSMENT INPUT DATA

Introduction

The proposed development has the potential to expose future occupants to elevated pollutant levels. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations across the development site, detailed dispersion modelling was undertaken in accordance with the following methodology.

Modelling was undertaken for 2023 to allow verification against recent monitoring results and 2027 to represent likely conditions in the opening year of the scheme.

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.

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

These are detailed in the following Sections.

Assessment Area

The assessment area was defined based on the location of the development and roads likely to impact pollutant levels across the site. Ambient concentrations were predicted over the area NGR: 381805, 410055, 382430 to 410680. One cartesian grid was included within the model to product data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 7 for a graphical representation of the assessment area.

Traffic Flow Data

Baseline traffic data for use in the assessment, including 24-hour AADT flows and fleet composition as HDV proportion, was obtained from the Department for Transport (DfT)²¹. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years

²¹ <https://roadtraffic.dft.gov.uk/#6/55.254/-11.107/basemap-regions-countpoints>.

1999 to 2024. It should be noted that the DfT web tool is referenced in DEFRA guidance²² 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 8.0). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

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

Table A.1: Traffic Data

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Road Width (m)	Speed (km/h)
		2023	2027			
L1	M66 Northbound (NB), south of Junction 2	55,083	56,581	5.42	7.5	110
L2	M66 NB, Junction 2	44,066	45,265	5.42	7.7	110
L3	M66 NB, north of Junction 2	31,685	32,547	8.43	6.9	110
L4	M66 Southbound (SB), north of Junction 2	33,670	34,586	8.81	7.7	110
L5	M66 SB, Junction 2	43,354	44,534	5.64	6.7	110
L6	M66 SB, south of Junction 2	54,193	55,667	5.64	12.1	110
L7	M66 NB, off slip road	11,017	11,316	5.42	9.1	80
L8	M66 NB, on slip road	6,337	6,509	8.43	8.8	80
L9	M66 SB, off slip road	6,734	6,917	8.81	10.8	80
L10	M66 SB, on slip road	10,839	11,133	5.64	7.5	80
L11	Rochdale Road Westbound (WB), Slow Phase (SP)	9,255	9,506	5.98	6.3	20
L12	Rochdale Road Eastbound (EB)	9,255	9,506	5.98	6.1	35
L13	Rochdale Road	10,209	10,487	5.59	6.9	20
L14	Bury New Road WB	10,467	10,752	6.05	8.5	20
L15	Bury New Road	20,676	21,238	5.81	9.2	35
L16	Bell Lane	17,718	18,475	1.86	11.9	35
L17	Rochdale Old Road	17,718	18,475	1.86	7.8	35
L18	Rochdale Old Road	17,718	18,475	1.86	7.8	35

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

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Road Width (m)	Speed (km/h)
		2023	2027			
L19	Heywood Street	12,089	12,605	1.29	13.2	35
L20	Bond Street, slip road	12,089	12,605	1.29	6.6	20
L21	Bond Street	12,089	12,605	1.29	8.3	35
L22	Wash Lane	12,089	12,605	1.29	7.4	35
L23	Rochdale Road EB, SP	9,255	9,506	5.98	9.2	20
L24	Rochdale Road WB	9,255	9,506	5.98	5.7	35
L25	Bell Lane	17,718	18,475	1.86	8.3	35
R1	Junction 2 roundabout	29,041	30,769	5.42	12.1	20

Reference should be made to Figure 4 for a graphical representation of the road link locations.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (Version 13.1). This has been produced by DEFRA and incorporates COPERT 5.8 vehicle emission factors and fleet information.

There is 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, 2023 emission factors were utilised in preference to the development opening year in order to provide robust concentration predictions. As predictions for 2023 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 Manchester Airport meteorological station over the period 1st January 2023 to 31st December 2023 (inclusive). Manchester Airport is located at NGR: 381792, 384116, which is approximately 26.1km south 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 the 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 value 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 0.2m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'agricultural areas (min)'.

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 meteorological site. This value is considered appropriate for both areas and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Background Concentrations

Background concentrations used in the assessment were obtained from the DEFRA mapping study for the grid square containing the site, as shown in Table 10.

Similarly to emission factors, background concentrations from 2023 were utilised in preference to the future 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 NO₂ concentrations were converted to NO₂ concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance²³.

Verification

The 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 2023 using traffic data, meteorological data and monitoring results from this year.

Monitoring of NO₂ concentrations was undertaken at three locations within the vicinity of roads included within the model during 2023. Results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance²⁴. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A.2.

Table A.2: Verification - Monitoring Results

Monitoring Location	Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
BU12NO	38.7	63.04

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

²⁴ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Monitoring Location	Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
BU13NO	35.0	51.18
BU18NO	30.2	37.12

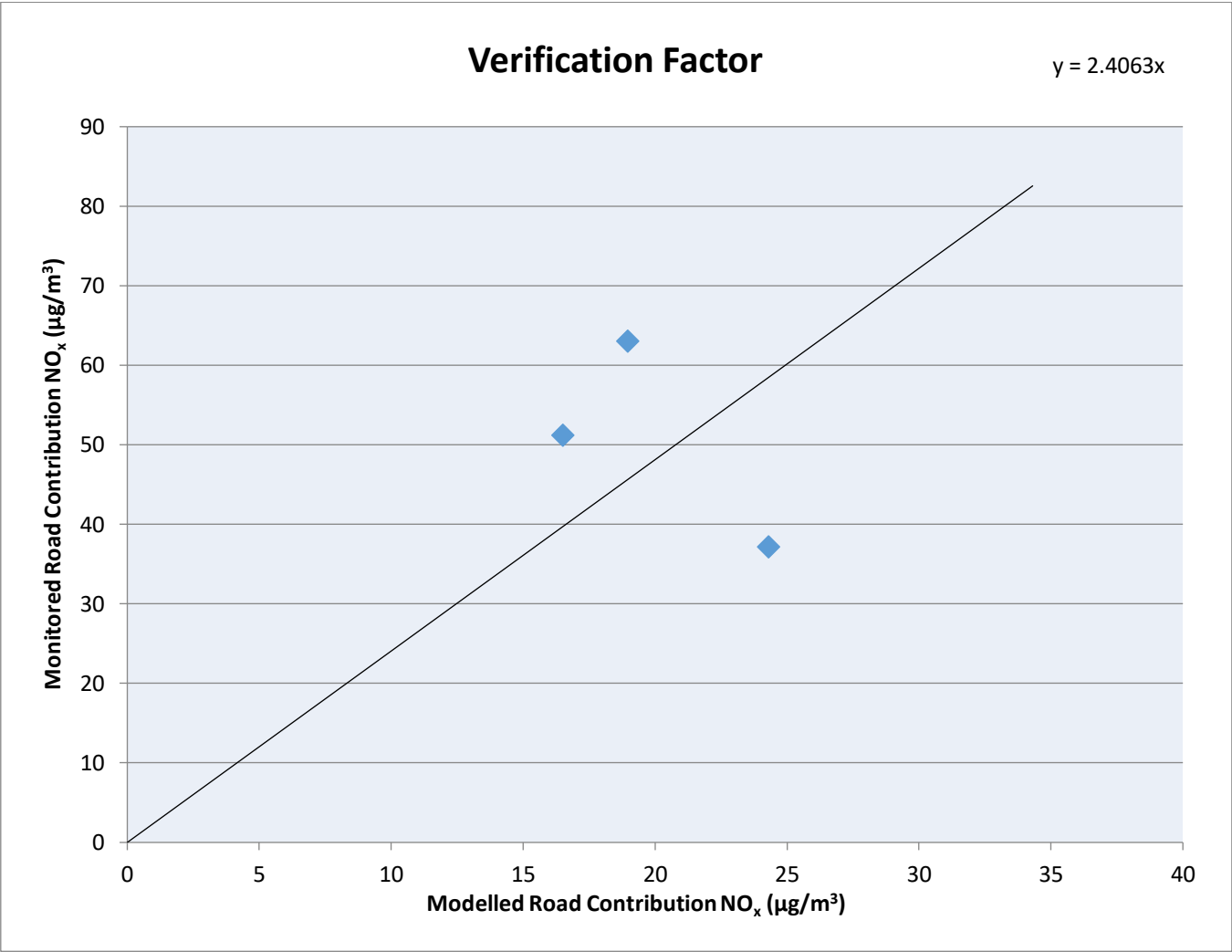
The annual mean road NO_x concentrations predicted from the dispersion model and the 2023 road NO_x concentrations calculated from the monitoring results are summarised in Table A.3.

Table A.3: Verification - Modelling Results

Monitoring Location	Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
BU12NO	63.04	18.96
BU13NO	51.18	16.50
BU18NO	37.12	24.31

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 2.4063 was required to be applied to all NO_x modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



Monitoring of PM₁₀ or 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 guidance²⁵.

²⁵ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

APPENDIX 3: FIGURES

