

Air Quality Assessment

Unit A Finlan Road, Stakehill Industrial
Estate, Middleton, M24 2SJ



Presented to: UBS Triton Property Fund

Issued: May 2025

Lucion Contract Reference: 649225.120999

Report Details

Client	UBS Triton Property Fund
Report Title	Air Quality Assessment
Site Address	Unit A Finlan Road, Stakehill Industrial Estate, Middleton, M24 2SJ
Contract Reference	649225.120999
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Quality Assurance

Issue No.	Status	Issue Date	Comments	Author	Technical Review	Authorised
1	Draft	26 th April 2023	Updated dispersion modelling and report template			
				Hazel Swinfen Consultant	Siobhan Goodman Senior Consultant	Hazel Swinfen Consultant
2	Final	6 th May 2025	-			
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About Us

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As part of Lucion's group of companies, we can support you with a broader range of holistic services. Through our pool of multidisciplinary experts, we help you navigate complex regulatory frameworks, saving you time and money.

Being part of your sustainable supply chain is a key goal for our team. As a member of the UN Global Compact and a commitment to sustainability, we are the partner of choice for businesses looking to make informed decisions and mitigate risks across your portfolio.

Lucion is carbon neutral. We annually measure and report our Scope 1, Scope 2 and specified Scope 3 carbon emissions, and offset 100% of residual emissions through verified carbon credits, supporting carbon reduction and prevention projects overseas. We are taking steps to reduce our carbon emissions and have committed to setting and achieving near-term and Net Zero Science-Based carbon reduction targets in line with the goals of the Paris Agreement to limit global warming to 1.5°C above pre-industrial levels. Lucion is a signatory of Pledge to Net Zero and Members of the United Nations Global Compact.

If you would like support in understanding your carbon emissions, or those of your supply chain, please get in touch with your Lucion contact above who will be happy to help.

Executive Summary

Site and Report Context	Lucion Delta-Simons Ltd ("Lucion") was instructed by UBS Triton Property Fund (the 'Client') to undertake an Air Quality Assessment in support of a planning application for a development located at Unit A Finlan Road, Stakehill Industrial Estate in Middleton, M24 2SJ (the 'Site'). The proposed works at the Site comprise the demolition of existing single storey extension and service yard canopy, erection of extension and alterations to existing building, change of use to allow a flexible use within Classes B2, B8 and / or E(g)(iii) and a series of physical works to reconfigure the Site including an extension to the service yard, new hard and soft landscaping and associated infrastructure (the 'Proposed Development'). The Site is located in close proximity to the Greater Manchester Air Quality Management Area (AQMA), declared by Greater Manchester Combined Authority (GMCA) based on the modelled $35\mu\text{g}/\text{m}^3$ isopleths for nitrogen dioxide (NO_2). The Site is also located in an area where air quality is mainly influenced by road traffic emissions along the local road network and as such, elevated pollutant concentrations may be experienced at this location. Consequently, the Proposed Development should be assessed to determine whether it has the potential to cause adverse impacts to existing pollutant levels at nearby sensitive receptors, as a result of fugitive dust and plant/vehicle emissions during construction and road vehicle exhaust emissions during operation. Accordingly, an Air Quality Assessment has been prepared to determine baseline conditions across and in the vicinity of the Site and to assess potential impacts associated with the Proposed Development, in accordance with the requirements of the National Planning Policy Framework (NPPF). The Air Quality Assessment will, therefore, consider ambient pollutant concentrations namely NO_2 and particulate matter (PM_{10} and $\text{PM}_{2.5}$), in the vicinity of the Site. This report presents the findings of the assessment, which addresses the potential air quality impacts during both the construction and operational phases of the Proposed Development. For both phases, the type, source and significance of potential impacts were identified, and the measures that should be employed to minimise these proposed.
Summary	The assessment of construction phase impacts associated with fugitive dust and fine particulate matter of an aerodynamic diameter of less than 10 and 2.5 microns, respectively (PM_{10} and $\text{PM}_{2.5}$) emissions has been undertaken in line with the relevant Institute of Air Quality Management (IAQM) guidance. This identified that there is a medium to low risk of dust soiling impacts, and a low risk of increases in particulate matter concentrations due to unmitigated construction activities. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases would be significantly reduced. The residual effects of the construction phase on air quality are considered to be not significant. The Proposed Development is expected to result in a negligible to slight impact associated with the operational phase traffic on nearby receptors and the residual effects are considered to be not significant.
Conclusions and Recommendations	Based on the results of the assessment, it is considered that, the Proposed Development complies with national and local planning policies and there are no air quality constraints considered to restrict planning consent.
This is intended as a summary only. Further detail and limitations of the assessment is provided within the main body of the Report.	

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1.0 Introduction

1.1 Appointment

- 1.1.1 Lucion Delta Simons Ltd ("Lucion") was instructed by UBS Triton Property Fund (the 'Client') to undertake an Air Quality Assessment to inform a planning application for an industrial development (the "Proposed Development"), located at Unit A Finlan Road, Stakehill Industrial Estate in Middleton, M24 2SJ (the "Site").
- 1.1.2 Reference should be made to **Figure 1** for a map of the Site and surrounding area.

1.2 Site Location and Context

- 1.2.1 The Site is located in close proximity to the Greater Manchester Air Quality Management Area (AQMA), declared by Greater Manchester Combined Authority (GMCA) based on the modelled $35\mu\text{g}/\text{m}^3$ isopleths for nitrogen dioxide (NO_2). The Site is also located in an area where air quality is mainly influenced by road traffic emissions along the local road network and as such, elevated pollutant concentrations may be experienced at this location.
- 1.2.2 Subsequently, there are concerns that the development has the potential to cause adverse impacts to existing pollution levels at nearby sensitive receptors as a result of fugitive dust emissions during construction and road vehicle exhaust emissions during operation. As such, an Air Quality Assessment was required to determine baseline conditions at the Site, consider its suitability for the proposed end-use and to assess potential impacts associated with the Proposed Development in accordance with the requirements of the National Planning Policy Framework (NPPF) (as revised 2024). The Air Quality Assessment will therefore consider ambient pollutant concentrations namely NO_2 and particulate matter (PM_{10} and $\text{PM}_{2.5}$) in the vicinity of the Site.
- 1.2.3 The main potential sources of air pollution were identified as emissions from road transport using the local road network. There are no combustion sources identified within 500m of the site.
- 1.2.4 The report presents the findings of an assessment of the potential air quality impacts of the Proposed Development during both the construction and operational phases. For both phases, the type, source and significance of potential impacts are identified, and the measures that should be employed to minimise these described.
- 1.2.5 The standard limitations associated with this assessment are presented in **Appendix A**.
- 1.2.6 A glossary of terms used in this report is provided in **Appendix B**.

2.0 Legislation and Policy

- 2.1.1 A summary of the relevant air quality legislation is provided below.

Air Quality Strategy (2023)

- 2.1.2 The Government's policy on air quality within England is set out in the Air Quality Strategy: Framework for Local Authority Delivery (AQS)¹. The AQS provides a framework for reducing air pollution in England.
- 2.1.3 The AQS sets standards and objectives for nine key air pollutants to protect health, vegetation and ecosystems. These are benzene (C₆H₆), 1,3 butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), particulate matter (PM₁₀ and PM_{2.5}), sulphur dioxide (SO₂), ozone (O₃), and polycyclic aromatic hydrocarbons (PAHs). The standards and objectives for the pollutants considered in this assessment are given in **Appendix C**.
- 2.1.4 The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) with regards to current scientific knowledge about the effects of each pollutant on health and the environment.
- 2.1.5 The air quality objectives are medium-term policy-based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e., a limited number of permitted exceedances of the standard over a given period.
- 2.1.6 For the pollutants considered in this assessment, there are both long-term (annual mean) and short-term standards. In the case of NO₂, the short-term standard is for a 1-hour averaging period, whereas for PM₁₀ it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants, for example temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road.
- 2.1.7 The AQS contains a framework for considering the effects of a finer group of particles known as 'PM_{2.5}' as there is increasing evidence that this size of particles can be more closely associated with observed adverse health effects than PM₁₀. Local authorities are required to work towards reducing emissions/concentrations of particulate matter within their administrative area.

Environmental Improvement Plan (2023)

- 2.1.8 The Environmental Improvement Plan² 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).

Air Quality Regulations (2016)

- 2.1.9 Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000³ and the Air Quality (England) (Amendment) Regulations 2002⁴ for the purpose of Local Air Quality Management (LAQM).
- 2.1.10 These Regulations require that likely exceedances of the AQS objectives are assessed in relation to:

'[...] the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present [...]'

¹ Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2).

² Defra (2023). Environmental Improvement Plan.

³ The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928.

⁴ The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043.

- 2.1.11 The Air Quality Standards (Amendment) Regulations 2016⁵ amends the Air Quality Standards Regulations 2010 that transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as PM₁₀, PM_{2.5} and NO₂.

Environmental Protection Act 1990 - Control of Dust and Particulates Associated with Construction

- 2.1.12 Section 79 of the Environmental Protection Act 1990 gives the following definitions of statutory nuisance relevant to dust and particles:

'Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance'; and

'Any accumulation or deposit which is prejudicial to health or a nuisance'.

- 2.1.13 Following this, Section 80 says that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.
- 2.1.14 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. Nuisance is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

Environment Act 2021

- 2.1.15 Schedule 11 contains amendments of Part IV of the Environment Act 1995⁶ (air quality). Local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the AQOs defined in the Regulations. There is a requirement for local authorities to identify relevant sources of emissions that are likely to be responsible for any failure to achieve the AQOs within the area of jurisdiction, or to identify relevant sources within neighbouring authorities and to identify them. Where the objectives are not likely to be achieved, within the relevant period, an authority is required to designate AQMA. For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

Clean Air Strategy (2019)

- 2.1.16 In 2019, the UK government released its Clean Air Strategy 2019⁷, part of its 25 Year Environment Plan⁸. The Strategy sets out the comprehensive action that is considered to be required from across all parts of government and society.
- 2.1.17 The primary focus of air quality management has primarily related to NO₂, and its principal source in the UK, road traffic. The 2019 Strategy aims to broaden the focus to other areas, including actions on clean growth, and emissions from domestic wood burning stoves, industry and agriculture.

2.2 Planning Policy

- 2.2.1 A summary of the national and local planning policy relevant to the Proposed Development and air quality is provided below.

⁵ The Air Quality Standards (Amendment) Regulations 2016 - Statutory Instrument 2016 No. 1184.

⁶ Environment Act 2021 [Online] Available at: https://www.legislation.gov.uk/ukpga/2021/30/pdfs/ukpga_20210030_en.pdf?timeline=false.

⁷ Department for Environment, Food and Rural Affairs (Defra) (2019) Clean Air Strategy 2019.

⁸ Department for Environment Food and Rural Affairs (Defra) (2018) A Green Future: Our 25 Year Plan to Improve the Environment.

National Planning Policy

National Planning Policy Framework (December 2024)

2.2.2 The Government's overall planning policies for England are described in the NPPF⁹. The core underpinning principle of the Framework is the presumption in favour of sustainable development, defined as:

'[...] meeting the needs of the present without compromising the ability of future generations to meet their own needs.'

2.2.3 One of the three overarching objectives of the NPPF is that planning should 'contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'

2.2.4 In relation to air quality, the following paragraphs in the document are relevant:

- Paragraph 56, which states 'Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.';
- Paragraph 110, which states 'Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health';
- Paragraph 187, which states '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, taking into account relevant information such as river basin management plans;';
- Paragraph 198, which states 'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development ';
- Paragraph 199, which states '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.'; and
- Paragraph 201, which states 'The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities'.

⁹ Ministry of Housing, Communities & Local Government (2024) NPPF.

Regional Planning Policy

- 2.2.5 A summary of relevant local policies is outlined below, however their compliance and soundness in relation to national policy has not been assessed in this instance.

Greater Manchester Places for Everyone - Joint Development Plan Document (2021)

- 2.2.6 The Greater Manchester 'Places for Everyone Joint Development Plan Document - Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan Publication Plan'¹⁰, was considered at the Places for Everyone Joint Committee on 20th July 2021, and was subsequently approved by Rochdale Borough Council (RBC) in March 2024.

- 2.2.7 Policy JP-S 6 'Clean Air' is relevant to the assessment:

'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 in accordance with 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;

3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data and, if approved, to make appropriate provision for future monitoring of air pollution; [...]

5. Significantly expanding the network of electric vehicle charging points, both for public and private use, including as part of new developments; [...]

8. Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees; [...]

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.'

Local Planning Policy

Rochdale Core Strategy (2016)

- 2.2.8 The Rochdale Core Strategy¹¹ was adopted by RBC in October 2016 and sets out planning for the district until 2028. A review of this document highlighted the following as relevant to this assessment.

- 2.2.9 According to Policy 'G9 - Reducing the impact of pollution, contamination and land instability':

'[The Council] 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 [...] or other pollution;

¹⁰ Greater Manchester (2021) Places for Everyone Joint Development Plan Document - Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan [Online] Available at: <https://www.greatermanchester-ca.gov.uk/media/4838/places-for-everyone.pdf> [Accessed on 29/04/2023].

¹¹ Rochdale Borough Council (2016) Rochdale Core Strategy [Online] Available at: <https://www.rochdale.gov.uk/downloads/file/405/core-strategy> [Accessed on 29/04/2025].

[...]

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

2.2.10 Furthermore, Policy 'DM1 - General development requirements' outlines that:

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

- a. Are of high quality design and take the opportunity to enhance the quality of the area;*
- b. Are compatible with surrounding land uses, both in terms of its impact upon those uses and the impact of the surrounding land uses upon the amenities of future residents / users;*
- c. Do not adversely affect the amenity of residents or users [...];*
- d. Mitigate against any impacts due to [...] air, dust [...] and odour pollution, traffic generation or inadequate access, where such mitigation is identified as being necessary;*
- e. Provide satisfactory vehicular access with adequate parking, manoeuvring, and servicing arrangements taking into account of the proposed use and location;*
- f. Do not have an adverse impact on health, through its impact or the effect of existing problems e.g. [...] poor air quality.'*

2.2.11 Moreover, Policy 'DM2 - Delivering planning contributions and infrastructure' details that:

'[The Council] will require developers to:

[...]

- b. Mitigate the impact of development through planning obligations and agreements, if the development would otherwise have a negative impact on the delivery of a Strategic Objective.*

[...]

For all types of development, [...] [the Council] 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: [...]

- e. Mitigation of compensation against environmental impacts e.g. [...] air quality (particularly in Air Quality Management Areas).'*

2.2.12 The above policies relating to air quality have been considered within this assessment.

2.3 Guidance

2.3.1 A summary of the publications referred to in the undertaking of this assessment is provided below.

Local Air Quality Management Technical Guidance (August 2022)

2.3.2 The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their review and assessment work¹². This guidance, referred to in this document as Local Air Quality Management Technical Guidance (LAQM.TG22), has been used where appropriate in the assessment presented herein.

¹² Department for Environment, Food and Rural Affairs (Defra) (2022) Part IV of the Environment Act 1995 as amended by the Environment Act 2021 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG22.

Land-Use Planning & Development Control: Planning for Air Quality (2017)

- 2.3.3 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance¹³ that offers comprehensive advice on when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and the possible mitigation measures that may be implemented to minimise these impacts.

Guidance on the Assessment of Dust from Demolition and Construction (2024)

- 2.3.4 This document¹⁴ published by the IAQM was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM₁₀ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

National Planning Practice Guidance - Air Quality (2019)

- 2.3.5 This guidance¹⁵ provides a number of guiding principles on how the planning process can take into account the impact of new development on air quality, it explains how much detail air quality assessments need to include for proposed developments, and how impacts on air quality can be mitigated. It also provides information on how air quality is taken into account by local authorities in both the wider planning context of Local Plans and neighbourhood planning, and in individual cases where air quality is a consideration in a planning decision.

Greater Manchester Air Quality Action Plan 2016 - 2021 (2016)

- 2.3.6 A joint Greater Manchester AQAP¹⁶ has been prepared, which identifies the sources of air pollution within the area and sets out the actions that GMCA plan to deliver between 2016-2021 (and beyond), in order to improve air quality. This AQAP aims to bring together a robust and meaningful set of actions and measures that will bring about an improvement in air quality, to benefit the health of the population. The measures fall into a number of categories, specifically: reducing emissions from road traffic, protection of air quality through enforcement of air pollution legislation, awareness raising, action through building design and land use planning, and increased energy efficiency.

Greater Manchester Low-Emission Strategy (2016)

- 2.3.7 The Low Emission Strategy¹⁷ takes a long-term, integrated approach to carbon emissions and air quality in the period up to 2040, allowing the Council to focus investment to the greatest effect. It establishes a framework within which the Council develop detailed action plans to reduce carbon emissions and improve air quality.
- 2.3.8 The aims of this strategy are to:
- Support the UK Government in meeting all EU thresholds for key pollutants at the earliest date;
 - Contribute to reducing Greater Manchester's carbon footprint, in line with the Greater Manchester Climate Change Strategy and Implementation Plan; and
 - Reduce air pollution as a contributor to ill-health in Greater Manchester.

¹³ Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017) Land Use Planning & Development Control: Planning for Air Quality.

¹⁴ Institute of Air Quality Management (Version 2.2 Updated January 2024). Guidance on the Assessment of Dust from Demolition and Construction.

¹⁵ Department of Communities and Local Government (DCLG) (Updated November 2019) National Planning Practice Guidance.

¹⁶ Greater Manchester Combined Authority (2016) Air Quality Action Plan 2016-2021 [Online] Available at: <https://greatermanchester-ca.gov.uk/media/1272/air-quality-action-plan-2016-21.pdf> [Accessed on 13/04/2023].

¹⁷ Greater Manchester Combined Authority (2020) Greater Manchester Low-Emission Strategy (2016) [Online] Available at: https://assets.ctfassets.net/tlpgbvvy1k6h2/6wQl2dxjRXZ2SCVByUBdOf/a13a19c17cc61261cb5b80_8943358f84/low-emission-strategy-dec-2016.pdf [Accessed on 13/04/2023].

Greater Manchester's Clean Air Plan to Tackle Nitrogen Dioxide Exceedences at the Roadside (GM CAP) (2021)

- 2.3.9 In Greater Manchester, the 10 local authorities, the GMCA and Transport for Greater Manchester, have worked together to develop a Clean Air Plan (CAP)¹⁸ to ensure Greater Manchester achieves compliance with the relevant AQOs for NO₂ by 2026 at the latest.
- 2.3.10 The initial CAP proposal included implementation of a Class C charging Clean Air Zone. The GMCA has subsequently updated the CAP proposals 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.

Covid-19 Supplementary Guidance for LAQM Reporting in 2021

- 2.3.11 As a result of the impacts from Covid-19 and the associated restrictions on activity, supplementary guidance¹⁹ has been published to inform local authorities in England of the key changes and points of reference with respect to LAQM duties, as described in Part IV of the Environment Act 1995, for the 2021 reporting year. This supplementary guidance document should be read in conjunction with Defra's LAQM.TG22 document (2022).

¹⁸ GMCA and Transport for Greater Manchester (2022) Case for a New GM Clean Air Plan.

¹⁹ Department for Environment, Food and Rural Affairs (Defra) (2021) Covid-19 Supplementary Guidance Local Air Quality Management Reporting in 2021 [Online] Available at: <https://laqm.defra.gov.uk/documents/Covid-19%20-%20Supplementary%20Guidance%20for%20Local%20Air%20Quality%20Management%20Reporting%20in%202021%20v1.pdf> [Accessed on 13/04/2023].

3.0 Scope & Methodology

3.1 Scope

3.1.1 The scope of the assessment has been determined in the following way:

- Review of Council's latest available review and assessment report²⁰ and air quality data for the area surrounding the Site, including data from the Council, Defra²¹ and the Environment Agency (EA)²²;
- Desk study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality; and
- Review of the traffic data provided by the Project Transport Consultant (the PTC).

3.1.2 The scope of the assessment includes consideration of the potential impacts on local air quality resulting from:

- Dust and particulate matter generated by on-site activities during the construction phase;
- Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic and plant; and
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once operational.

3.2 Methodology

Construction Phase

3.2.1 Dust comprises particles typically in the size range 1-75 micrometres (μm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials. The larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. Dust therefore, is unlikely to cause long-term or widespread changes to local air quality; however, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of nuisance through amenity loss or perceived damage caused, which is usually temporary.

3.2.2 The smaller particles of dust are known as particulate matter (PM), with less than $10\mu\text{m}$ in aerodynamic diameter (PM_{10}) representing only a small proportion of total dust released; this includes a finer fraction, known as $\text{PM}_{2.5}$ (with an aerodynamic diameter less than $2.5\mu\text{m}$). As these particles are at the smaller end of the size range of dust particles, they remain suspended in the atmosphere for a longer period of time than the larger dust particles, they can therefore be transported by wind over a wider area. PM_{10} and $\text{PM}_{2.5}$ are small enough to be drawn into the lungs during breathing, which in sensitive members of the public could have a potential impact on health. However, it is worth noting that, according to the IAQM guidance, the majority of fugitive particulate emissions arising from construction sites are expected to relate to the coarser fractions (i.e. $\text{PM}_{2.5-10}$) with just 10-15% expected to comprise $\text{PM}_{2.5}$. The IAQM guidance therefore focusses on PM_{10} for the purposes of assessment.

3.2.3 An assessment of the likely significant impacts on local air quality due to the generation and dispersion of dust and PM_{10} during the construction phase has been undertaken using: the relevant assessment methodology published by the IAQM; the available information for this phase of the Proposed Development provided by the Client and Project Team; and professional judgement.

²⁰ GMCA (2024) RGMCA 2023 Air Quality Annual Status Report.

²¹ Defra Local Air Quality Management (LAQM) Support Pages. Available at: <http://laqm.defra.gov.uk/>

²² <https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory>

3.2.4 The IAQM methodology assesses the risk of potential dust and PM₁₀ impacts from the following four sources: demolition; earthworks; general construction activities and track-out. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM₁₀ levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. A summary of the IAQM assessment methodology is provided in **Appendix D**.

3.2.5 In addition to impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the application Site and in the vicinity of the Application Site itself. As information on the number of vehicles and plant associated with the construction phase was not available at the time of writing, a qualitative assessment of their impact on local air quality has been undertaken using professional judgement and by considering the following:

- The number and type of construction traffic and plant likely to be generated by this phase of the Development;
- The number and proximity of sensitive receptors to the application Site and along the likely routes to be used by construction vehicles; and
- The likely duration of the construction phase and the nature of the construction activities undertaken.

Operational Phase Assessment

3.2.6 Of the pollutants included in the AQS, concentrations of NO₂ and particulate matter (PM₁₀ and PM_{2.5}) have been considered in this assessment as road traffic is a major source of these pollutants and their concentrations tend to be close to, or in exceedance of, the objectives in urban locations.

3.2.7 In order to predict NO₂ and PM concentrations at sensitive locations, the advanced dispersion model ADMS-Roads (version 5.0.0.1) has been used. This model uses detailed information regarding traffic flows on the local road network, surface roughness and local meteorological conditions to predict pollutant concentrations. Details of the model input parameters are presented in **Appendix E**.

Meteorological Data

3.2.8 Meteorological data, such as wind speed and direction, is used by the model to determine pollutant transportation and levels of dilution by the wind. Meteorological data used in the model was obtained from the observing station at Manchester Airport 2023. This station is considered to provide representative data for the assessment. A wind rose generated from the meteorological data used for the dispersion modelling of operational phase impacts is provided in **Appendix F**.

Traffic Data

Traffic Flows

3.2.9 A summary of traffic data and pollutant emission factors used in the assessment can be found in **Appendix E**. It includes details of the Annual Average Daily Traffic (AADT) flows, vehicle speeds (km/h) and the percentage of Heavy Duty Vehicles (HDVs) for the local road network in all assessment years considered. Traffic speeds were reduced at junctions in line with guidance provided in LAQM.TG22 and using professional judgement.

3.2.10 For the assessment, scenarios were modelled, as follows:

- 2023 - Model Verification and Baseline;
- 2026 - Assumed Opening Year Do Minimum; and
- 2026 - Assumed Opening Year Do Something.

3.2.11 Reference should be made to **Figure 1** for a graphical representation of the modelled road link locations.

Vehicle Emission Factors

- 3.2.12 Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factors Toolkit (EFT) (version 13.1) provided on the Defra website²³. This has been produced by Defra and incorporates COPERT 5.8 vehicle emission factors and fleet information.
- 3.2.13 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, 2023 emission factors were utilised in preference to the Site development year in order to provide robust concentration predictions. As predictions for 2023 were verified, it is considered that results are an indication of worst-case concentrations during the operation of the Proposed Development when applying 2023 emission factors for the 2026 assumed operational year.

Selection of Background Concentrations

- 3.2.14 Background pollutant data for the operational phase assessment have been taken from the national maps provided on the Defra website²⁴, where background concentrations of those pollutants included within the AQS have been mapped at a grid resolution of 1x1km for the whole of the UK. Estimated background concentrations are available for all years between 2021 and 2040. The maps assume that background concentrations will improve (i.e., reduce) over time, in line with the predicted reduction in vehicle emissions, and emissions from other sources. The 2021 reference year background maps are the most up-to-date version of the background maps for NO_x, NO₂, PM₁₀ and PM_{2.5} and should be used for all new air quality assessments of these pollutants.
- 3.2.15 Within these maps, background concentrations are available for 2021 to 2040. These 2021 reference year maps have been calibrated using 2021 monitoring and meteorological data

Model Verification and Result Processing

- 3.2.16 The ADMS Roads dispersion model has been widely validated for this type of assessment and is considered to be fit for purpose. Model validation undertaken by the software developer will not have included validation in the vicinity of the Proposed Development.
- 3.2.17 To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out by RBC was undertaken. This process of verification aims to minimise modelling uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results and was carried out following the methodology specified in Chapter 7, Section 4, of LAQM.TG22.
- 3.2.18 Details of the verification factor calculations are presented in **Appendix E**. A factor of **1.587** was obtained during the verification process, indicating that the model was under-predicting, as a result, no factoring is required for the modelled road-NO_x outputs prior to conversion to annual mean NO₂ concentrations utilising the NO_x to NO₂ Calculator (version 9.1, August 2024) provided by Defra²⁵. Reference should be made to **Figure 2**, which shows the diffusion tube monitoring locations.
- 3.2.19 As local roadside monitoring data within the assessment extents are not available for PM₁₀ or PM_{2.5}, the modelled road-PM₁₀ and road-PM_{2.5} components have been adjusted by the verification factor obtained for NO_x before adding to the appropriate background concentration. The number of days with PM₁₀ concentrations greater than 50µg/m³ was then estimated using the relationship with the annual mean concentration described in LAQM.TG22.
- 3.2.20 Once processed, the predicted concentrations were compared against the relevant AQS objective levels for NO₂, PM₁₀ and PM_{2.5} set out in **Appendix C**.

²³ Department for Environment, Food and Rural Affairs (Defra) (2024) Emissions Factor Toolkit (version 13.0) [Online] Available at: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Faqm.defra.gov.uk%2Fwp-content%2Fuploads%2F2024%2F08%2FEFT2024_v12.1.xlsb&wdOrigin=BROWSELINK.

²⁴ Department for Environment, Food and Rural Affairs (Defra) (2023) Background Concentrations [Online] Available at: <https://uk-air.defra.gov.uk/data/laqm-background-home>

²⁵ Department for Environment, Food and Rural Affairs (Defra) NO_x to NO₂ Calculator v9.1 (August 2024) [Online] Available at: <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/>

- 3.2.21 The air quality modelling generates pollutant estimates of road source contributed NO_x, PM₁₀ and PM_{2.5} at specified receptors. To permit comparison with the relevant air quality objectives for NO₂, PM₁₀ and PM_{2.5} it has been necessary to combine the model outputs data with the background concentrations.
- 3.2.22 To consider compliance with the 1-hour mean air quality objective for NO₂, Defra's guidance suggests that in locations where the annual mean NO₂ concentration exceeds 60µg/m³ then the 1-hour mean objective may be exceeded. Where annual mean concentrations are less than 60µg/m³ then exceedance of the 1-hour mean objective is considered unlikely. The risk of non-compliance with the 1-hour mean objective, where up to 18 exceedances of a 1-hour mean concentration of 200µg/m³ are allowed in a calendar year, is therefore considered likely when the annual mean concentration is greater than 60µg/m³ but unlikely when not. This approach has been adopted for this assessment.
- 3.2.23 To estimate total annual mean concentrations for PM₁₀ and PM_{2.5}, for comparison with the annual mean air quality objectives (40 and 25 µg/m³ respectively) the model output concentrations are simply added to the background concentrations for these pollutants.
- 3.2.24 To consider compliance with the 24-hour mean air quality objective for PM₁₀, Defra's guidance gives the following equation that relates the annual mean concentration to the number of exceedances of the 24-hour mean concentration of 50µg/m³, where up to 35 exceedances are allowed:
- No. 24-hour mean exceedances = $-18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean})$
- 3.2.25 This approach has been adopted for 24-hour mean PM₁₀ for this assessment.

3.3 Selection of Sensitive Receptors

- 3.3.1 Sensitive locations are places where the public or sensitive ecological habitats may be exposed to pollutants resulting from activities associated with the Proposed Development. These will include locations sensitive to an increase in dust deposition and PM₁₀ exposure as a result of on-site construction activities, and locations sensitive to exposure to gaseous pollutants emitted from the exhausts of construction and operational traffic associated with the Proposed Development.

Construction Phase

- 3.3.2 The IAQM assessment is undertaken where there are: 'human receptors' within 250m of the Site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the Site entrance(s); and/or 'ecological receptors' within 50m of the Site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the Site entrance(s). It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors.

Operational Phase

- 3.3.3 In terms of locations that are sensitive to pollutants emitted from engine exhausts, these will include places where members of the public are likely to be regularly present over the period of time prescribed in the AQS. For instance, on a footpath where exposure will be transient (for the duration of passage along that path) comparison with a short-term standard (i.e. 15-minute mean or 1-hour mean) may be relevant. At a school or adjacent to a private dwelling, where exposure may be for longer periods, comparison with a long-term standard (such as 24-hour mean or annual mean) may be more appropriate. Box 1.1 of LAQM.TG22 provides examples of the locations where the air quality objectives should/should not apply.
- 3.3.4 To complete the assessment of operational phase impacts, a number of 'receptors' representative of locations of relevant public exposure were identified at which pollution concentrations were predicted. Receptors have been located adjacent to the roads that are likely to experience the greatest change in traffic flows or composition, and therefore NO₂ and particulate matter concentrations, as a result of the Proposed Development.
- 3.3.5 The locations of the assessment receptors are shown on **Figure 3** and listed in **Table 1**.

Table 1 - Receptor Locations Used in the Assessment

Receptor	Description / Address	Grid Reference		Height above Ground Level (m)
		X (m)	Y (m)	
R1	29 Bentley Avenue	388612.5	408379.7	1.5
R2	226 Stakehill Lane	388942.5	408569.9	1.5
R3	695 Rochdale Road	388484.5	408384.1	1.5
R4	720 Rochdale Road	388497.5	408429.3	1.5
R5	686 Rochdale Road	388395.6	408226.7	1.5

3.4 Significance criteria

Construction Phase

- 3.4.1 The IAQM assessment methodology recommends that significance criteria is only assigned to the identified risk of dust impacts occurring from a construction activity with appropriate mitigation measures in place. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.
- 3.4.2 For the assessment of the impact of exhaust emissions from plant used on-site and construction vehicles accessing and leaving the Site on local concentrations of NO₂ and particulate matter, the significance of residual effects has been determined using professional judgement and the principles outlined in the EPUK/IAQM guidance, which are described below.

Operational Phase

- 3.4.3 The approach provided in the EPUK/IAQM guidance has been used within this assessment to assist in describing the air quality effects of additional emissions from traffic generated by the Proposed Development once operational.
- 3.4.4 This guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion, as summarised in **Table 2**.

Table 2 - Road Vehicle Exhaust Emissions - Significance of Impact

Long Term Average Concentration at Receptors in Assessment Year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2 - 5	6 - 10	> 10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 - 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 - 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 - 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Notes

AQAL = air quality assessment Level, which for this assessment related to the UK Air Quality Strategy objectives and limit values. Where the %change in concentrations is <0.5%, the change is described as 'Negligible' regardless of the concentration. When defining the concentration as a percentage of the AQAL, 'without scheme' concentration should be used where there is a decrease in pollutant concentration and the 'with scheme;' concentration where there is an increase. Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.

- 3.4.5 The matrix shown in **Table 2** 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.
- 3.4.6 Following the prediction of impacts at discrete receptor locations, the EPUK/IAQM document 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.
- 3.4.7 The EPUK/IAQM guidance states that for most road transport related emissions, long-term average concentrations are the most useful for evaluating the impacts. The guidance does not include criteria for determining the significance of the effect on hourly mean NO₂ concentrations or daily mean PM₁₀ concentrations. The significance of effects of hourly mean NO₂ and daily mean PM₁₀ concentrations arising from the operational phase have therefore been determined qualitatively using professional judgement and the principles described above.
- 3.4.8 The EPUK/IAQM guidance says that 'Where the air quality is such that an air quality objective at the building facade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.'
- 3.4.9 The EPUK/IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. It should be noted that this is a binary judgement of either it is significant or it is not significant.

4.0 Baseline

4.1 Introduction

- 4.1.1 Existing air quality conditions in the vicinity of the Site were identified in order to provide a baseline for consideration. These are detailed in the following sections.

4.2 Local Air Quality Management

- 4.2.1 According to the latest available Air Quality ASR from GMCA²⁶ and Defra²⁷, the Greater Manchester AQMA covers the ten districts of Greater Manchester, including arterial routes, district centres and the airport, and was declared based on the modelled 35µg/m³ isopleths for annual mean NO₂ concentrations. The Site is located, at its closest point, approximately 270m west of one section of this AQMA. However, the closest receptors to the Site are not located within the AQMA, as such, potential effects associated with the Proposed Development have not been considered at sensitive receptor locations within this area.

4.3 Local Emission Sources

- 4.3.1 The Site is located in an area where air quality is mainly influenced by emissions from road transport using the local road network.
- 4.3.2 There are no industrial pollution sources identified within the immediate vicinity of the Site that will influence the local air quality.

4.4 Air Quality Monitoring

- 4.4.1 Monitoring of pollutant concentrations is undertaken by the Council throughout their area of jurisdiction utilising continuous and passive methods. Data has also been collected by the GMCA to inform the CAP. Recent diffusion tube monitoring results recorded in the vicinity of the development are shown in **Table 3**.

Table 3 - Diffusion Tube Monitoring Results

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)*				
ID	Type	2019	2020	2021	2022	2023
RO2ANO	Urban Background	-	-	-	-	27.6
RO3ANO	Urban Background	22.1	16.0	16.4	17.0	16.4
RO7ANO	Urban Background	32.1	25.2	27.7	26.4	26.1
RO8ANO	Roadside	44.7	33.6	36.6	36.3	32.1
RO9ANO	Kerbside**	39.6	30.3	34.9	36.4	26.6
RO22ANO	Kerbside	43.4	31.5	32.7	32.2	30.2
RO23ANO	Roadside	37.8	27.6	31.4	31.7	29.8
RO24ANO	Urban Background**	30.0	24.8	23.1	24.0	25.2

²⁶ Greater Manchester Combined Authority (2024) 2023 Air Quality Annual Status Report (ASR) [Online] Available at: https://assets.ctfassets.net/tlpgbvy1k6h2/5x3t00AUL4BX3MB4YJVgRI/9c731d8f31974e15a731b064f9625446/GM_Air_Quality_Annual_Status_Report_2021pdf.pdf [Accessed on 13/04/2025].

²⁷ Department for Environment, Food and Rural Affairs (Defra) (undated) List of Local Authorities with AQMA's [Online] Available at: <https://uk-air.defra.gov.uk/aqma/list> [Accessed on 13/04/2023].

RO29ANO, RO30ANO, R031ANO***	Roadside	-	-	31.1	30.6	23.1
Rochdale Queensway	Roadside	-	-	28.5	27	26
CAP_ROCH_003	Roadside	45.3	29.4	33.4	33.5	32.88
CAP_ROCH_014	Roadside	-	-	-	39.0	38.22
CAP_ROCH_009	Roadside	60.7	48.7	44.6	38.1	39.07
CAP_ROCH_013	Roadside	-	-	-	41.5	39.42

*Exceedances of the AQO are highlighted in **bold**.

** Whilst the GMCA ASR describes diffusion tubes RO9ANO and RO24ANO as having 'Kerbside' and 'Urban Background' locations, respectively, both are located approximately 1m from the kerb of a main road. As such, the verification locations used in this assessment are deemed to be 'Roadside', in line with the descriptions in the Defra LAQM.TG22.

***Co-located with automatic monitor.

4.4.2 As shown in **Table 3**, the annual mean NO₂ concentration was above the AQO of 40µg/m³ at the RO8ANO, RO22ANO, CAP_Roch003, CAP_ROCH_009 and CAP_ROCH_013 monitors in recent years. Levels were below at all remaining positions in recent years.

4.4.3 RBC undertake monitoring of PM₁₀ concentrations within the vicinity of the site. Recent results are shown in **Table 4**.

Table 4 - PM₁₀ Monitoring Results

Monitoring Site		Monitored PM ₁₀ Concentration (µg/m ³)*				
ID	Type	2019	2020	2021	2022	2023
Rochdale Queensway	Roadside	-	-	15.5	18	15

4.4.4 As shown in **Table 4**, annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ in recent years.

4.4.5 RBC also undertake monitoring of PM_{2.5} concentrations within the vicinity of the site. Recent results are shown in **Table 5**.

Table 5 - PM_{2.5} Monitoring Results

Monitoring Site		Monitored PM _{2.5} Concentration (µg/m ³)*				
ID	Type	2019	2020	2021	2022	2023
Rochdale Queensway	Roadside	-	-	9.2	10	9

4.4.6 As shown in **Table 5**, annual mean PM_{2.5} concentrations were below the AQO of 20µg/m³ in recent years.

4.4.7 Reference should be made to **Figure 2** for a map of the monitoring locations.

4.5 Background Pollutant Concentrations

- 4.5.1 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 Local Authorities in their Review and Assessment of air quality. Data for the assessment extents was downloaded from the Defra website²⁸ for the purpose of the project. This data is summarised in **Table 4**.

Table 6 - Predicted Background Pollutant Concentrations (2023)

OS Grid Reference (X, Y; m)	Predicted Annual Mean Concentration (µg/m ³)			
	NO ₂	NO _x	PM ₁₀	PM _{2.5}
388500, 408500	12.75	17.03	12.16	7.00
389500, 407500	12.65	16.88	12.08	6.89
389500, 408500	13.19	17.67	12.47	6.91

- 4.5.2 As shown in **Table 4**, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs across the assessment extents.

²⁸ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021>

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

Dust and PM₁₀ Arising from On-Site Activities

- 5.2.1 Construction activities that have the potential to generate and/or re-suspend dust and PM₁₀ include:
- Site clearance and preparation including demolition activities;
 - Preparation of temporary access/egress to the Site and haulage routes;
 - Earthworks;
 - Materials handling, storage, stockpiling, spillage and disposal;
 - Movement of vehicles and construction traffic within the Site (including excavators and dumper trucks);
 - Use of crushing and screening equipment/plant;
 - Exhaust emissions from plant, especially when used at the extremes of their capacity and during mechanical breakdown;
 - Construction of buildings, roads and areas of hardstanding alongside fabrication processes;
 - Internal and external finishing and refurbishment;
 - Trackout, whereby earth is carried from the Site on vehicle tyres, deposited on roads and may later become suspended in the air as a result of vehicle movements; and
 - Site landscaping after completion.
- 5.2.2 The majority of the releases are likely to occur during the 'working week'. However, for some potential release sources (e.g. exposed soil produced from significant earthwork activities) in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

Assessment of Potential Dust Emission Magnitude

- 5.2.3 The IAQM assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and PM₁₀ sources: demolition; earthworks; construction; and, trackout. The findings of the assessment are presented below.

Demolition

- 5.2.4 The total volume of buildings to be demolished on the Site is assumed to be between 12,000m³ and 75,000m³. As such, the potential dust emission magnitude is considered to be **medium** for demolition activities.

Earthworks

- 5.2.5 The total area of the Site between 18,000m² and 110,000m². The potential dust emission magnitude is considered to be **medium** for earthwork activities, based on the size of the Site.

Construction

- 5.2.6 The total volume of buildings to be constructed on the Site is assumed to be greater than 75,000m³. Therefore, the potential dust emission magnitude is considered to be **large** for construction activities.

Trackout

- 5.2.7 Information on the number of HDVs associated with this phase of the Proposed Development is not available and therefore professional judgement has been used. Whilst the unpaved road length on the Site is less than 50m, it is assumed that there will be approximately 20 to 50 HDV trips per day over the construction period. As such, it is considered that the potential dust emission magnitude is **medium** for trackout.
- 5.2.8 **Table 7** provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 7 - Potential Dust Emission Magnitude

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

Assessment of Sensitivity of the Study Area

- 5.2.9 A windrose generated using the meteorological data used for the dispersion modelling of operational phase impacts is provided in **Appendix F**. This shows that the prevailing wind direction is predominantly from the south-through to the west. Therefore, receptors located to the north through to the east of the Site are more likely to be affected by dust and PM emitted and re-suspended during the construction phase.
- 5.2.10 Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. Receptors north through to the east of the Site are expected to be affected the most as a result of the prevailing wind direction. It has been assumed that the construction traffic will access the Site through the existing access road.
- 5.2.11 There are no sensitive ecological designation is within close proximity to site or the route that will be used by construction vehicles and is likely to be considered sensitive to dust or PM, and as such these effects are not considered further within this assessment.
- 5.2.12 Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM₁₀ has been derived for each of the construction activities considered. The results are shown in **Table 8**.

Table 8 - Sensitivity of the Study Area

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

Risk of Impacts

- 5.2.13 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. **Table 9** below provides a summary of the risk of dust impacts for the Proposed Development. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 9 - Summary Dust Risk Table to Define Site Specific Mitigation

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

Construction Vehicles & Plant

- 5.2.14 The greatest impact on air quality due to emissions from vehicles and plant associated with the construction phase will be in the areas immediately adjacent to the Site access. Construction traffic will access the Site via the local road network. Due to the size of the Site, it is considered likely that the construction traffic will be low in comparison to the existing traffic flows on these roads.
- 5.2.15 Final details of the exact plant and equipment likely to be used on-site will be determined by the appointed contractor, it is considered likely to comprise dump trucks, tracked excavators, diesel generators, asphalt spreaders, rollers, compressors and trucks. The number of plant and their location within the Site are likely to be variable over the construction period.
- 5.2.16 Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, and the likely numbers of construction vehicles and plant that will be used, the impacts are therefore considered to be **negligible** according to the assessment significance criteria.

5.3 Operational Phase Assessment

- 5.3.1 Existing vehicle movements, and those associated with the operation of the Proposed Development will generate exhaust emissions on the local and regional road networks, which have the potential to affect existing sensitive receptors. 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 considered the following three scenarios:
- 2023 - Model Verification;
 - 2026 - Anticipated Completion Year Do Minimum; and
 - 2026 - Anticipated Completion Year Do Something.
- 5.3.3 The 2026 scenarios included anticipated baseline traffic data, inclusive of local committed developments and anticipated growth for the relevant assessment year, in addition to predicted vehicle trips associated with the operation of the Proposed Development, provided by the PTC and calculated using the UK Government's Trip End Model Presentation Program (TEMPro) version 8.1, where applicable.
- 5.3.4 It is reiterated that for the purpose of the assessment, traffic data for 2026 were utilised as the anticipated development opening year. Air quality is predicted to improve in the future based on expected reduction in roadside levels as a result of technological advancements. However, in order to provide a robust assessment, emission factors and background concentrations for 2023 were utilised within the assessment. The uses of 2026 traffic data and 2023 emission factors and background concentrations are considered to provide a worst-case scenario and therefore, a sufficient level of confidence can be placed within the predicted pollutant concentrations.

Road Vehicle Exhaust Emission Impacts

- 5.3.5 Full results of the dispersion modelling are presented in **Appendix G** and a summary is provided below.
- 5.3.6 It should be noted that all presented results have been verified in accordance with the methodology outlined within **Appendix E**.

Nitrogen Dioxide

Annual Mean

- 5.3.7 Annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ at all existing sensitive receptor locations in each of the modelled 2026 scenarios. The highest annual mean NO₂ concentrations of 30.49µg/m³ and 31.21µg/m³ were predicted at R4 '720 Rochdale Road', in the 'Without Development' and 'With Development' scenarios, respectively. Two receptors within the assessment extents are predicted to experience **slight** impacts with the remaining three receptors experiencing **negligible** impacts on annual mean NO₂ concentrations.
- 5.3.8 The maximum predicted increase as a result of the Proposed Development was 0.74µg/m³ at receptor R4 '720 Rochdale Road', resulting in a **slight adverse** impact from the additional traffic associated with the operation of the Proposed Development, leading to an effect which is considered to be **not significant** in accordance with the EPUK/IAQM assessment criteria.

1-hour Mean

- 5.3.9 The annual mean NO₂ concentrations predicted by the model were all below 60µg/m³, and therefore hourly mean NO₂ concentrations are unlikely to cause a breach of the hourly mean AQS objective. The impact of the Proposed Development on hourly mean NO₂ concentrations at existing sensitive receptors is considered to be **negligible**, with the resulting effect considered to be **not significant**.

Particulate Matter (PM₁₀)

Annual Mean

- 5.3.10 Annual mean PM₁₀ concentrations were predicted to be well below the AQO of 40µg/m³ at all sensitive receptor locations in each of the modelled 2026 scenarios. The highest concentration is predicted at receptor R4 '720 Rochdale Road', with a concentration of 16.16µg/m³ in the 'Do Something' scenario with an increase of 0.15µg/m³ as a result of the Proposed Development.
- 5.3.11 The predicted changes in annual mean PM₁₀ concentrations are all <0.5% of the relevant AQS objective. Based on the EPUK/IAQM guidance, the impact of the increased emissions associated with the Proposed Development on annual mean PM₁₀ concentrations is considered to be **negligible**.

24-hour Mean

- 5.3.12 There has been no predicted increase in the number of days exceeding the daily PM₁₀ limit in the 'Do Something' scenario, without the risk of exceedance of the AQS objective. As such, the impacts of increased emissions associated with the operational phase of the Proposed Development are **negligible**.

Particulate Matter (PM_{2.5})

- 5.3.13 Annual mean PM_{2.5} concentrations were predicted to be well below the Concentration Target of 10µg/m³ in each of the modelled 2026 scenarios. The highest modelled concentration is predicted at receptor R4 '720 Rochdale Road', with a concentration of 8.96µg/m³ in the 'Do Something' scenario with an increase of 0.09µg/m³ as a result of the Proposed Development.
- 5.3.14 All changes in PM_{2.5} as a result of increased traffic associated with the Proposed Development are <0.5% of the relevant Concentration Target and therefore, based on the EPUK/IAQM guidance, the Proposed Development is considered to have a **negligible** impact on annual mean PM_{2.5} concentrations.

Summary

- 5.3.15 Based on the extent of predicted population exposure to the impacts on pollutant concentrations and the guidance provided by the IAQM, the overall effect of the Proposed Development is considered to be **not significant**.
- 5.3.16 Based on the assessment results, the Site is considered suitable for the Proposed Development without the implementation of mitigation measures.

Interim Planning Guidance for PM_{2.5}

- 5.3.17 Interim Planning Guidance²⁹ 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 10**, along with the development response.

Table 10 - Interim Planning Guidance Questions

Potential Impact	Risk
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 emission during both construction and in-use	The results of the assessment indicated that predicted PM_{2.5} emissions were below the Concentration Target of 10µg/m³ at all sensitive locations within the vicinity of the site The proposals comprise a place of work and are therefore not considered sensitive to long-term pollutant exposure As outlined in Section 6.0 below, 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 and to reduce emissions of PM_{2.5} and its precursors? Factors to consider include: • 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	The development includes a reduction in staff car parking spaces, as well as the addition of 9 electric vehicle charging spaces. Furthermore, secure cycle storage areas will be provided to encourage sustainable transport modes 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

- 5.3.18 Based on the responses in **Table 10** and the results of the assessment, as outlined in Sections 5.0 and 6.0, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of PM_{2.5}.

²⁹ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.0 Mitigation and Residual Effects

6.1 Construction Phase

Mitigation

- 6.1.1 Based on the assessment results, mitigation will be required during the construction phase of the Proposed Development. Recommended mitigation measures are given below.

General Communication

- A stakeholder communications plan that includes community engagement before work commences on-site should be developed and implemented.
- The name and contact details of person(s) accountable for air quality and dust issues should be displayed on the Site boundary. This may be the environment manager/engineer or the site manager. The head or regional office contact information should also be displayed.

Site Management

- All dust and air quality complaints should be recorded and causes identified. Appropriate remedial action should be taken in a timely manner with a record kept of actions taken including of any additional measures put in-place to avoid reoccurrence.
- The complaints log should be made available to the Local Authority on request.
- Any exceptional incidents that cause dust and/or air emissions, either on or off-site should be recorded, and then the action taken to resolve the situation recorded in the log book.

Monitoring

- Daily on-site and off-Site inspections should be undertaken, where receptors (including roads) are nearby to monitor dust. The inspection results should be recorded and made available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the Site boundary, with cleaning to be provided if necessary.
- The frequency of Site inspections should be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Preparing and maintaining the Site

- Plan the Site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable.
- Where practicable, erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on-site.
- Where practicable, fully enclose Site or specific operations where there is a high potential for dust production and the Site is active for an extensive period.
- Avoid Site runoff of water or mud.
- Keep Site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from Site as soon as possible, unless being re-used on-site. If they are being re-used on-site cover appropriately.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicle operators 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.
- A Construction Logistics Plan should be produced 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 such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems
- Ensure an adequate water supply on the Site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on-site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Avoid bonfires and burning of waste materials.

Measures Specific to Demolition

- Ensure that effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- Stockpile surface areas should be minimised (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up.
- Where practicable, windbreak netting/screening should be positioned around material stockpiles and vehicle loading/unloading areas, as well as exposed excavation and material handling operations, to provide a physical barrier between the Site and the surroundings.
- Where practicable, stockpiles of soils and materials should be located as far as possible from sensitive properties, taking account of the prevailing wind direction.
- During dry or windy weather, material stockpiles and exposed surfaces should be dampened down using a water spray to minimise the potential for wind pick-up.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
- All construction plant and equipment should be maintained in good working order and not left running when not in use.

Measures Specific to Trackout

- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Detailed mitigation measures to control construction traffic should be discussed with the Local Authority to establish the most suitable access and haul routes for the site traffic. The most effective mitigation will be achieved by ensuring that construction traffic does not pass along sensitive roads (residential roads, congested roads, via unsuitable junctions, etc.) where possible, and that vehicles are kept clean (through

the use of wheel washers, etc.) and sheeted when on public highways. Timing of large-scale vehicle movements to avoid peak hours on the local road network will also be beneficial.

Residual Effects

- 6.1.2 The residual effects of dust and PM₁₀ generated by construction activities following the application of the mitigation measures described above and good site practice is considered to be **not significant**.
- 6.1.3 The residual effects of emissions to air from construction vehicles and plant on local air quality is considered to be **not significant**.

6.2 Operational Phase

Mitigation

- 6.2.1 The changes in pollutant concentrations attributable to traffic emissions associated with the operational phase of the Proposed Development (i.e. impacts on local air quality) are **negligible** and therefore in accordance with the assessment criteria, mitigation is not required.

Residual Effects

- 6.2.2 The Proposed Development is expected to result in in a **negligible** impact associated with the operational phase traffic on nearby receptors.
- 6.2.3 The residual effects of the Proposed Development on air quality is **not significant** for NO₂, PM₁₀ and PM_{2.5} according to the EPUK/IAQM assessment criteria.

7.0 Summary and Conclusions

- 7.1.1 Lucion has been appointed to prepare this Air Quality Assessment in support of the planning application for an industrial development located at Unit A Finlan Road, Stakehill Industrial Estate in Middleton, M24 2SJ.
- 7.1.2 A qualitative assessment of the potential impacts on local air quality from construction activities has been carried out for this phase of the Proposed Development using the IAQM methodology. This identified that there is a **low** to **medium risk** of dust soiling impacts, a **low** to **medium risk** of increases in particulate matter concentrations. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and PM₁₀ releases would be significantly reduced. The residual effects of dust and PM₁₀ generated by construction activities on air quality are therefore considered to be **not significant**. The residual effects of emissions to air from construction vehicles and plant on local air quality is considered to be **not significant**.
- 7.1.3 The Proposed Development is expected to result in a **slight** impact at two receptors and **negligible** impacts at all remaining receptors as a result of emissions associated with the operational phase traffic on nearby receptors. The residual effects are considered to be **not significant**.
- 7.1.4 The Site lies within an area where air quality is mainly influenced by emissions associated with traffic along the local road network. Pollutants considered in this assessment were NO₂ and Particulate Matter (PM₁₀ and PM_{2.5}).
- 7.1.5 Based on the assessment significance criteria, the residual effects of the Proposed Development are considered to be **not significant** for all pollutants assessed.
- 7.1.6 Furthermore, it is considered that the Proposed Development complies with national and local policy for air quality.
- 7.1.7 Based on the assessment results, air quality issues are not considered a constraint to planning consent.

Figure 1 - Site Red Line Boundary and Modelled Road Links

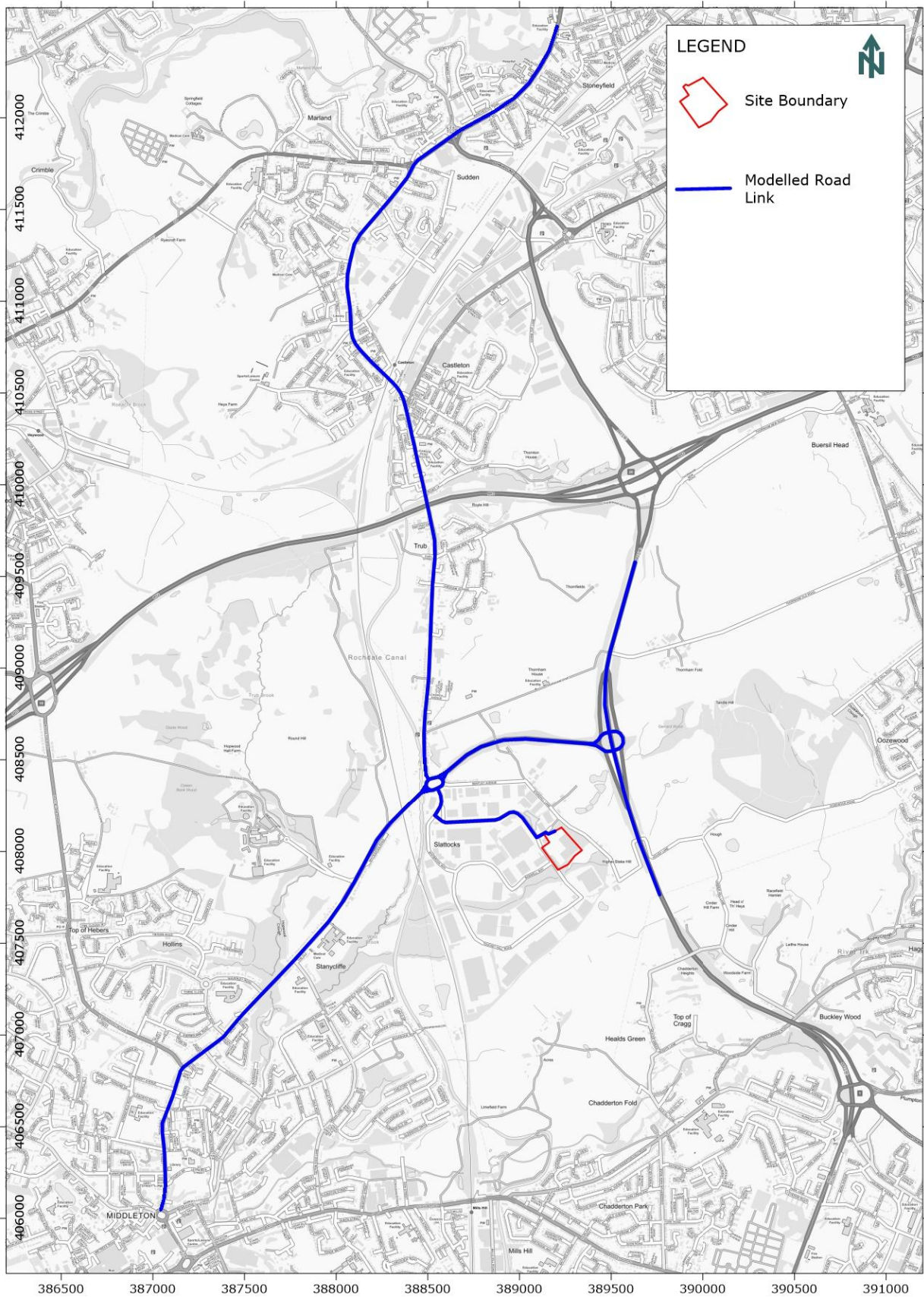
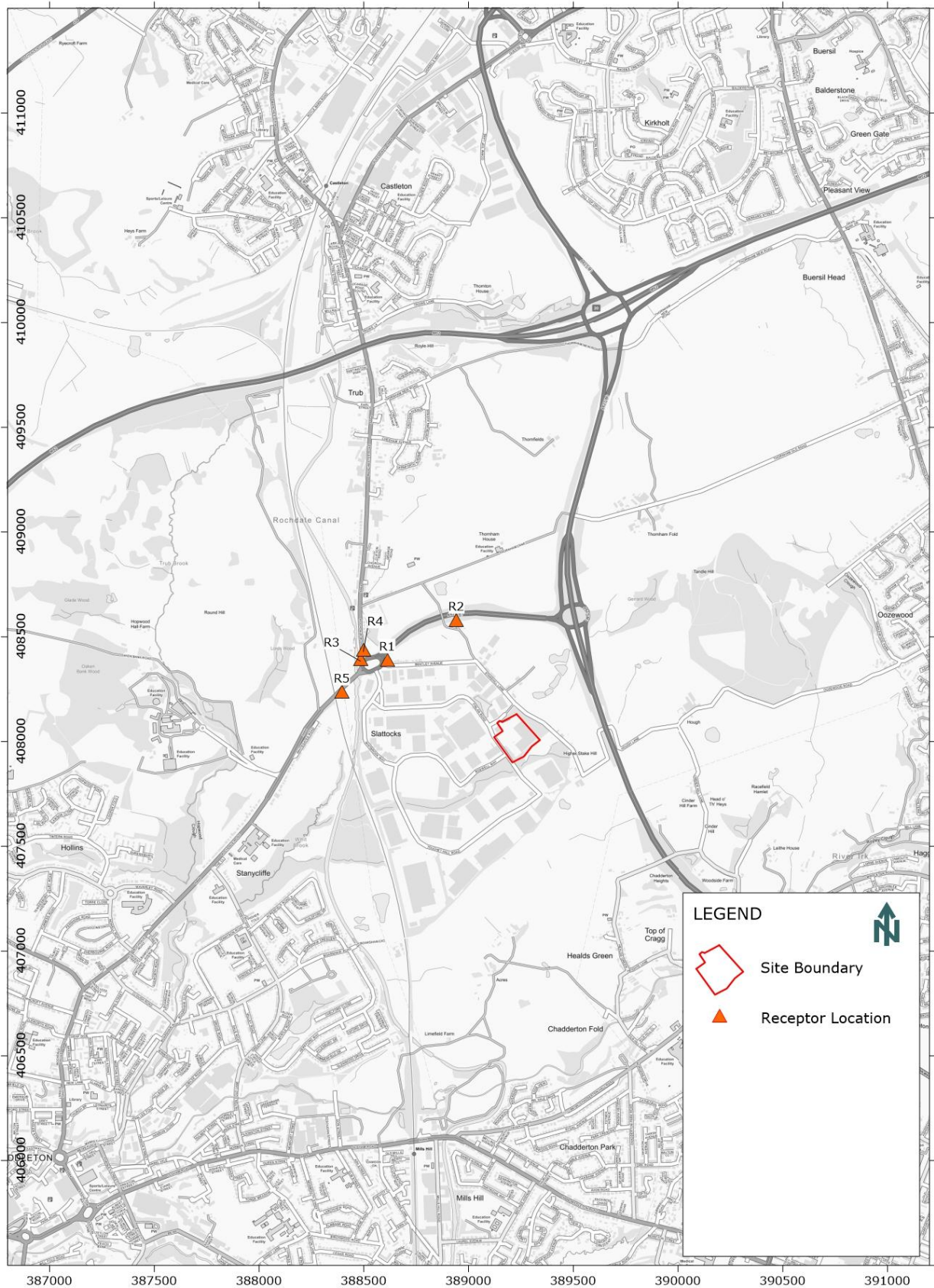


Figure 2 - Monitoring Locations

Figure 3 - Sensitive Existing Receptors

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Appendix A - Limitations

Limitations

The recommendations contained in this Report represent Lucion professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Lucion does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Lucion obtained, reviewed and evaluated information in preparing this Report from the Client and others. Lucion conclusions, opinions and recommendations has been determined using this information. Lucion does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Lucion has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

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Appendix B - Glossary

Glossary

Term	Definition
AADT	Annual Average Daily Traffic - A daily total traffic flow (24hrs), expressed as a mean daily flow across all 365 days of the year.
Adjustment	Application of a correction factor to modelled results to account for uncertainties in the model
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year.
AQMA	Air Quality Management Area.
AQO	Air Quality Objective.
AQS	Air Quality Standard
AURN	Automatic Urban and Rural (air quality monitoring) Network, managed by contractors on behalf of Defra.
Conservative	Tending to over-predict the impact rather than under-predict.
Data capture	The percentage of all the possible measurements for a given period that were validly measured.
Defra	Department for Environment, Food and Rural Affairs.
DfT	Department for Transport.
EFT	Emissions Factor Toolkit.
Emission rate	The quantity of a pollutant released from a source over a given period of time.
EPUK	Environmental Protection (UK).
Exceedance	A period of time where the concentration of a pollutant is greater than the appropriate air quality standard.
GMCA	Greater Manchester Combined Authority
HDV/HGV	Heavy Duty Vehicle/Heavy Goods Vehicle.
IAQM	Institute of Air Quality Management.

LAQM	Local Air Quality Management.
Model adjustment	Following model verification, the process by which modelled results are amended. This corrects for systematic error.
NO ₂	Nitrogen dioxide.
NO _x	Nitrogen oxides.
NPPF	National Planning Policy Framework
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
Road link	A length of road which is considered to have the same flow of traffic along it. Usually, a link is the road from one junction to the next.
RBC	Rochdale Borough Council
µg/m ³ microgrammes per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1µg/m ³ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy' and has replaced it on recent European legislation.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

Appendix C - Relevant UK Air Quality Strategy Objectives

Relevant UK Air Quality Strategy Objectives

National Air Quality Objectives and European Directive Limit Values for the Protection of Human Health						
Pollutant	Applies To	Objective	Measured As	Date to be achieved by and maintained thereafter	European Obligations	Date to be achieved by and maintained thereafter
Nitrogen dioxide (NO ₂)	UK	40µg/m ³	annual mean	31.12.2005	40µg/m ³	01.01.2010
	UK	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005	200µg/m ³ not to be exceeded more than 18 times a year	01.01.2010
Particulate Matter (PM ₁₀) (gravimetric) ^A	UK (except Scotland)	40µg/m ³	annual mean	31.12.2005	40µg/m ³	01.01.2010
	UK (except Scotland)	50µg/m ³ not to be exceeded more than 35 times a year	24-hour mean	31.12.2004	50µg/m ³ not to be exceeded more than 35 times a year	01.01.2005
Particulate Matter (PM _{2.5})	UK (except Scotland)	20µg/m ³	annual mean	2020	Particulate Matter (PM _{2.5})	UK (except Scotland)
	England	12µg/m ³ *	annual mean	31.01.2028		England
	England	10µg/m ³	annual mean	2040		England

^A Measured using the European gravimetric transfer sampler or equivalent

µg/m³ = microgram per cubic metre

*Target – not legally binding

Appendix D - IAQM Construction Assessment Methodology

IAQM Construction Assessment Methodology

Step 1 - Screening the Need for a Detailed Assessment

An assessment will normally be required where there are:

- 'human receptors' within 250m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s); and/or
- 'ecological receptors' within 50m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible'.

Step 2a - Define the Potential Dust Emission Magnitude

The following are examples of how the potential dust emission magnitude for different activities can be defined. (Note that not all the criteria need to be met for a particular class). Other criteria may be used if justified in the assessment.

Table D1 - Examples of Potential Dust Emission Magnitude

Magnitude	Activity	Criteria
Large	Demolition	>75,000m ³ building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >12m above ground level
	Earthworks	Total site area greater than 110,000m ² 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 >75,000m ³ 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	12,000 - 75,000m ³ building demolished, dusty material (e.g. concrete) 6-12m above ground level
	Earthworks	Total site area 18,000m ² to 110,000m ² ; 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 12,000m ³ to 75,000m ³ Potentially dusty construction material (e.g. concrete) On-site concrete batching
	Trackout	20 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Small	Demolition	<12,000m ³ building demolished, non-dusty material (e.g. metal cladding), <6m above ground level, work during wetter months

Magnitude	Activity	Criteria
	Earthworks	Total site area less than <18,000m ² ; 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 <3m in height
	Construction	Total building volume less than <12,000m ³ 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

Step 2b - Define the Sensitivity of the Area

The tables below present the IAQM assessment methodology to determine the sensitivity of the area to dust soiling, human health and ecological impacts respectively. The IAQM guidance provides guidance to allow the sensitivity of individual receptors to dust soiling and health effects to assist in the assessment of the overall sensitivity of the study area.

Table D2- Sensitivity of the Area to Dust Soiling Effects

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table D3 - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentrations (µg/m ³)	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM ₁₀ Concentrations (µg/m³)	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
	28-32	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table D4 - Sensitivity of the Area to Ecological Impacts

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

Step 2c - Define the Risk of Impacts

The dust emissions magnitude determined at Step 2A should be combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts without mitigation applied. For those cases where the risk category is 'negligible' no mitigation measures beyond those required by legislation will be required.

Table D5 - Risk of Dust Impacts

Sensitivity of Surrounding Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks, Construction and Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Step 3 - Site Specific Mitigation

Having determined the risk categories for each of the four activities it is possible to determine the site-specific measures to be adopted. These measures will be related to whether the site is considered to be a low, medium or high risk site. The IAQM guidance details the mitigation measures required for high, medium and low risk sites as determined in Step 2C.

Step 4 - Determine Significant Effects

Once the risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant effects arising from the construction phase. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.

Appendix E - Dispersion Model Details

Model Input Parameters

Traffic Flow Data

2023 is the most recent year for which appropriate monitoring data and meteorological data are available to enable verification of the model results, and so this year has been used as the baseline year for this assessment. 2026 is the anticipated operational year of the Proposed Development.

Baseline traffic data for use in the assessment, including 24-hour AADT flows and fleet composition as HDV proportion, were obtained from the PTC and DfT's Road Traffic Statistics website³⁰ where applicable. The DfT web tool enables the user to view and download available traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 2000 to 2023. It should be noted that the DfT web tool is referenced in Defra's LAQM.TG22 guidance 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.

Baseline traffic data was converted by the PTC to the anticipated operational year utilising a factor obtained from TEMPro (version 8.1). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

Table E1 - 2023 Verification/Baseline Traffic Data

Road Link	Name	AADT (Total vehicles)	%HDV	Speed (km/h)	NO _x Emission Factor (g/km/s)
1	Site access road onto Finlan Road, east of Whitbrook Way	498	23.4	10	0.007281
2	Whitbrook Way, north of Finlan Road, roundabout approach/exit	498	23.4	10	0.007281
3	Slattocks Roundabout	12,457	6.7	10	0.091772
4	A664 Rochdale Road, west of Slattocks Roundabout, roundabout approach/exit	17,687	2.9	10	0.100786
5	A664 Rochdale Road	17,687	2.9	10	0.100786
6	A664 Rochdale Road, north of Waverley Road	17,687	2.9	30	0.063994
7	A664 Rochdale Road, south of Waverley Road, north of A6046 Hollin Lane	15,793	3.6	30	0.059090
8	A664 Rochdale Road, south of A6046 Hollin Lane, north of Mellalieu Street/New Lane	19,353	2.6	30	0.069066
9	A664 Rochdale Road, south of Mellalieu Street/New Lane, north of Church Brow	19,353	2.6	20	0.081591
10	A664 Rochdale Road, south of Church Brow, roundabout approach/exit	19,353	2.6	10	0.107762
11	A627(M) Slattocks Link, roundabout approach/exit	12,236	10.6	10	0.110832
12	A627(M) Slattocks Link onto Slattocks Interchange Roundabout	12,236	10.6	80	0.040142

³⁰ Department for Transport (DfT) (2023) Road Traffic Statistics [Online] Available at: <https://roadtraffic.dft.gov.uk/#6/55.254/-6.064/basemap-regions-countpoints> [Accessed on 13/04/2023].

Road Link	Name	AADT (Total vehicles)	%HDV	Speed (km/h)	NO _x Emission Factor (g/km/s)
13	A627(M), north of Slattocks Link	58,085	6.3	95	0.192459
14	A627(M), south of Slattocks Link	57,548	6.4	95	0.190815
15	A664 Rochdale Road, north of Slattocks Roundabout, roundabout approach/exit	17,263	3.6	10	0.104207
16	A664 Rochdale Road onto Manchester Road, south of A664 Queensway	17,263	3.6	30	0.064676
17	A664 Manchester Road, north of A664 Queensway, south of Durban Street	14,464	3.1	30	0.052878
18	A664 Manchester Road, north of Durban Street, south of Keswick Street	14,464	3.1	15	0.070763
19	A664 Manchester Road, north of Keswick Street, south of A58 Bolton Road/Silk Street	14,464	3.1	30	0.052878
20	A58 Manchester Road, north of A58 Bolton Road/Silk Street, south of Rochdale Bypass/Edinburgh Way	32,194	3.2	20	0.140411
21	A58 Manchester Road, north of Rochdale Bypass/Edinburgh Way	38,365	3.5	20	0.170072
22	A58 Manchester Road, south of Kemp Avenue	38,365	3.5	15	0.192183
23	A58 Manchester Road, north of Kemp Avenue, south of Arbury Avenue	38,365	3.5	15	0.192183
24	A58 Manchester Road, north of Arbury Avenue, south of Tweeddale Street	38,365	3.5	30	0.142658

Table E2 – 2026 Do Minimum Traffic Data

Road Link	Name	AADT (Total vehicles)	%HDV	Speed (km/h)	NO _x Emission Factor (g/km/s)	PM ₁₀ Emission Factor (g/km/s)	PM _{2.5} Emission Factor (g/km/s)
1	Site access road onto Finlan Road, east of Whitbrook Way	498	23.43	10	0.007281	0.000396	0.000234
2	Whitbrook Way, north of Finlan Road, roundabout approach/exit	498	23.43	10	0.007281	0.000396	0.000234
3	Slattocks Roundabout	12,844	6.70	10	0.094626	0.007196	0.004043

Road Link	Name	AADT (Total vehicles)	%HDV	Speed (km/h)	NO _x Emission Factor (g/km/s)	PM ₁₀ Emission Factor (g/km/s)	PM _{2.5} Emission Factor (g/km/s)
4	A664 Rochdale Road, west of Slattocks Roundabout, roundabout approach/exit	18,237	2.85	10	0.103920	0.009233	0.005086
5	A664 Rochdale Road	18,237	2.85	10	0.103920	0.009233	0.005086
6	A664 Rochdale Road, north of Waverley Road	18,237	2.85	30	0.065984	0.008976	0.004829
7	A664 Rochdale Road, south of Waverley Road, north of A6046 Hollin Lane	16,284	3.60	30	0.060928	0.008161	0.004401
8	A664 Rochdale Road, south of A6046 Hollin Lane, north of Mellalieu Street/New Lane	19,955	2.55	30	0.071214	0.009749	0.005241
9	A664 Rochdale Road, south of Mellalieu Street/New Lane, north of Church Brow	19,955	2.55	20	0.084129	0.009854	0.005345
10	A664 Rochdale Road, south of Church Brow, roundabout approach/exit	19,955	2.55	10	0.111113	0.010019	0.005510
11	A627(M) Slattocks Link, roundabout approach/exit	12,617	10.60	10	0.114278	0.007758	0.004430
12	A627(M) Slattocks Link onto Slattocks Interchange Roundabout	12,617	10.60	80	0.041390	0.004517	0.002684
13	A627(M), north of Slattocks Link	59,891	6.33	95	0.198444	0.015351	0.009824
14	A627(M), south of Slattocks Link	59,338	6.37	95	0.196749	0.015225	0.009744
15	A664 Rochdale Road, north of Slattocks Roundabout, roundabout approach/exit	17,800	3.63	10	0.107447	0.009206	0.005094
16	A664 Rochdale Road onto Manchester Road, south of A664 Queensway	17,800	3.63	30	0.066687	0.008927	0.004815
17	A664 Manchester Road, north of A664 Queensway, south of Durban Street	14,913	3.08	30	0.054522	0.007381	0.003974

Road Link	Name	AADT (Total vehicles)	%HDV	Speed (km/h)	NO _x Emission Factor (g/km/s)	PM ₁₀ Emission Factor (g/km/s)	PM _{2.5} Emission Factor (g/km/s)
18	A664 Manchester Road, north of Durban Street, south of Keswick Street	14,913	3.08	15	0.072963	0.007524	0.004117
19	A664 Manchester Road, north of Keswick Street, south of A58 Bolton Road/Silk Street	14,913	3.08	30	0.054522	0.007381	0.003974
20	A58 Manchester Road, north of A58 Bolton Road/Silk Street, south of Rochdale Bypass/Edinburgh Way	33,195	3.16	20	0.144777	0.016648	0.009052
21	A58 Manchester Road, north of Rochdale Bypass/Edinburgh Way	39,558	3.46	20	0.175361	0.019989	0.010882
22	A58 Manchester Road, south of Kemp Avenue	39,558	3.46	15	0.198160	0.020155	0.011048
23	A58 Manchester Road, north of Kemp Avenue, south of Arbury Avenue	39,558	3.46	15	0.198160	0.020155	0.011048
24	A58 Manchester Road, north of Arbury Avenue, south of Tweedale Street	39,558	3.46	30	0.147094	0.019759	0.010651

Table E3 - 2026 Do Something Traffic Data

Road Link	Name	AADT (Total vehicles)	%HDV	Speed (km/h)	NO _x Emission Factor (g/km/s)	PM ₁₀ Emission Factor (g/km/s)	PM _{2.5} Emission Factor (g/km/s)
1	Site access road onto Finlan Road, east of Whitbrook Way	624	23.4	10	0.012322	0.000485	0.000313
2	Whitbrook Way, north of Finlan Road, roundabout approach/exit	624	23.4	10	0.012322	0.000485	0.000313
3	Slattocks Roundabout	12,970	6.9	10	0.123274	0.006454	0.004035
4	A664 Rochdale Road, west of Slattocks Roundabout, roundabout approach/exit	18,363	3.0	10	0.133668	0.008063	0.004978
5	A664 Rochdale Road	18,363	3.0	10	0.133668	0.008063	0.004978

Road Link	Name	AADT (Total vehicles)	%HDV	Speed (km/h)	NO _x Emission Factor (g/km/s)	PM ₁₀ Emission Factor (g/km/s)	PM _{2.5} Emission Factor (g/km/s)
6	A664 Rochdale Road, north of Waverley Road	18,363	3.0	30	0.083809	0.007505	0.004420
7	A664 Rochdale Road, south of Waverley Road, north of A6046 Hollin Lane	16,410	3.8	30	0.077526	0.006858	0.004042
8	A664 Rochdale Road, south of A6046 Hollin Lane, north of Mellalieu Street/New Lane	20,081	2.7	30	0.090298	0.008129	0.004786
9	A664 Rochdale Road, south of Mellalieu Street/New Lane, north of Church Brow	20,081	2.7	20	0.107335	0.008336	0.004993
10	A664 Rochdale Road, south of Church Brow, roundabout approach/exit	20,081	2.7	10	0.142512	0.008721	0.005378
11	A627(M) Slattocks Link, roundabout approach/exit	12,743	10.7	10	0.140967	0.004511	0.003267
12	A627(M) Slattocks Link onto Slattocks Interchange Roundabout	12,743	10.7	80	0.051099	0.003628	0.002384
13	A627(M), north of Slattocks Link	60,017	6.4	95	0.261307	0.015565	0.010400
14	A627(M), south of Slattocks Link	59,464	6.4	95	0.258936	0.015438	0.010315
15	A664 Rochdale Road, north of Slattocks Roundabout, roundabout approach/exit	17,926	3.8	10	0.138358	0.008078	0.005001
16	A664 Rochdale Road onto Manchester Road, south of A664 Queensway	17,926	3.8	30	0.084723	0.007493	0.004416
17	A664 Manchester Road, north of A664 Queensway, south of Durban Street	15,039	3.2	30	0.069438	0.006193	0.003648
18	A664 Manchester Road, north of Durban Street, south of Keswick Street	15,039	3.2	15	0.094006	0.006480	0.003935
19	A664 Manchester Road, north of Keswick Street, south of A58 Bolton Road/Silk Street	15,039	3.2	30	0.069438	0.006193	0.003648

Road Link	Name	AADT (Total vehicles)	%HDV	Speed (km/h)	NO _x Emission Factor (g/km/s)	PM ₁₀ Emission Factor (g/km/s)	PM _{2.5} Emission Factor (g/km/s)
20	A58 Manchester Road, north of A58 Bolton Road/Silk Street, south of Rochdale Bypass/Edinburgh Way	33,321	3.2	20	0.183904	0.014071	0.008436
21	A58 Manchester Road, north of Rochdale Bypass/Edinburgh Way	39,684	3.5	20	0.222486	0.016902	0.010138
22	A58 Manchester Road, south of Kemp Avenue	39,684	3.5	15	0.252338	0.017240	0.010477
23	A58 Manchester Road, north of Kemp Avenue, south of Arbury Avenue	39,684	3.5	15	0.252338	0.017240	0.010477
24	A58 Manchester Road, north of Arbury Avenue, south of Tweedale Street	39,684	3.5	30	0.185432	0.016465	0.009702

Roughness Length

The roughness length (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 and 0.2m was used to describe the meteorological station site. These z_0 values are considered appropriate for the morphology of the relevant areas and are suggested within ADMS-Roads as being suitable for 'Parkland, open suburbia' and 'Agricultural areas (min)', respectively.

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 10m the meteorological station site. These values are considered appropriate for the nature of the areas and are suggested within ADMS-Roads as being suitable for 'Mixed urban/industrial' and 'Small towns <50,000', respectively.

Model Verification

The comparison of modelled concentrations with local monitored concentrations is a process termed 'verification'. Model verification investigates the discrepancies between modelled and measured concentrations, which can arise due to the presence of inaccuracies and/or uncertainties in model input data, modelling and monitoring data assumptions. The following are examples of potential causes of such discrepancy:

- Estimates of background pollutant concentrations;
- Meteorological data uncertainties;
- Traffic data uncertainties;
- Model input parameters, such as 'roughness length'; and
- Overall limitations of the dispersion model.

The ADMS-Roads dispersion model has been widely validated for this type of assessment and is considered to be fit for purpose. Model validation undertaken by the software developer will not have included validation in the vicinity of the Proposed Development.

To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process of verification aims to minimise modelling

uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results and was carried out following the methodology specified in Chapter 7, Section 4, of LAQM.TG22.

Nitrogen Dioxide

Most NO₂ is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of the primary pollutant emissions of NO_x (NO_x = NO + NO₂), in line with the guidance provided within LAQM.TG22.

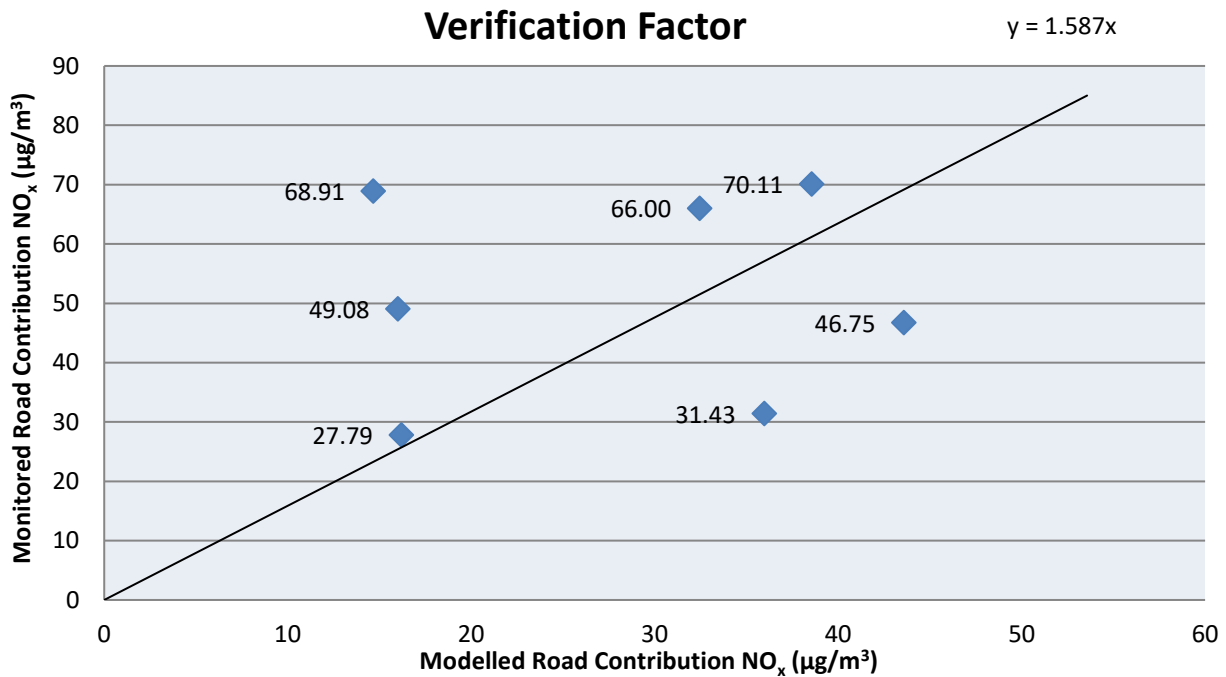
The model has been run to predict the 2023 annual mean road-NO_x contribution at seven roadside diffusion tubes within the modelled road network at the verification locations with suitable monitoring data and traffic data. The model outputs of road-NO_x have been compared with the 'measured' road-NO_x, which was determined from the NO₂ concentrations measured using the diffusion tubes, at the monitoring locations, utilising the NO_x to NO₂ Calculator provided by Defra and the NO₂ background concentration (from the Defra background map). As discussed in the methodology section, the most recent suitable monitoring data available for model verification purposes are 2023 data.

Table E4 - Model Verification

Site ID	2023 Monitored Total NO ₂ (µg/m ³)	2023 Background NO ₂ (µg/m ³)	2023 Monitored Road Contribution NO _x (µg/m ³)	2023 Modelled Road Contribution NO _x (µg/m ³)	Ratio
RO8ANO	32.10	13.19	46.75	43.57	1.0730
RO9ANO	26.60	13.19	31.43	35.96	0.8740
RO24ANO	25.20	13.19	27.79	16.19	1.7164
CAP_ROCH_003	32.88	13.19	49.08	16.00	3.0669
CAP_ROCH_014	38.22	13.19	66.00	32.44	2.0346
CAP_ROCH_009	39.07	13.19	68.91	14.66	4.7008
CAP_ROCH_013	39.42	13.19	70.11	38.55	1.8189

The road-NO_x adjustment factor was determined as the slope of the best fit line between the 'measured' road contribution and the model derived road contribution, forced through zero (**Figure E1**). This resulted in a factor of **1.587**, indicating that the model was under-predicting. This road-NO_x adjustment factor was applied to the modelled road-NO_x concentration for the monitoring site to provide adjusted modelled road-NO_x concentrations. The total nitrogen dioxide concentration was then determined by inputting the adjusted modelled road-NO_x concentration and the background NO₂ concentration into the NO_x to NO₂ calculator.

Figure E1 - Comparison of Measured Road-NO_x with Unadjusted Modelled Road-NO_x



There are no local PM₁₀ or PM_{2.5} monitoring data against which the model could be verified. Consequently, the verification factor determined above for adjusting the road-NO_x contribution has been applied to the predicted road-PM₁₀ and road-PM_{2.5} contributions, consistent with guidance set out in LAQM.TG22.

Model Uncertainty

An evaluation of model performance has been undertaken to establish confidence in model results. LAQM.TG22 identifies a number of statistical procedures that are appropriate to evaluate model performance and assess the uncertainty. These include:

- Root mean square error (RMSE);
- Fractional bias (FB); and
- Correlation coefficient (CC).

These parameters estimate how the model results agree or diverge from the observations. These calculations can be carried out prior to, and after adjustment, or based on different options for adjustment, and can provide useful information on model improvement. Further details can be found in Box 7-17 of LAQM.TG22.

Table E5 - Methods for Describing Model Uncertainty

Statistical parameter	Comments
RMSE	RMSE is used to define the average error or uncertainty of the model. The units of RMSE are the same as the quantities compared. If the RMSE values are higher than 25% of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. For example, if the model predictions are for the annual mean NO₂ objective of 40µg/m³, if an RMSE of 10µg/m³ or above is determined for a model it is advised to revisit the model parameters and model verification. Ideally an RMSE within 10% of the air quality objective would be derived, which equates to 4µg/m³ for the annual mean NO₂ objective.
Fractional Bias	It is used to identify if the model shows a systematic tendency to over or under predict. FB values vary between +2 and -2 and has an ideal value of zero. Negative values suggest a model over-prediction and positive values suggest a model under-prediction.
Correlation Coefficient	It is used to measure the linear relationship between predicted and observed data. A value of zero means no relationship and a value of 1 means absolute relationship.

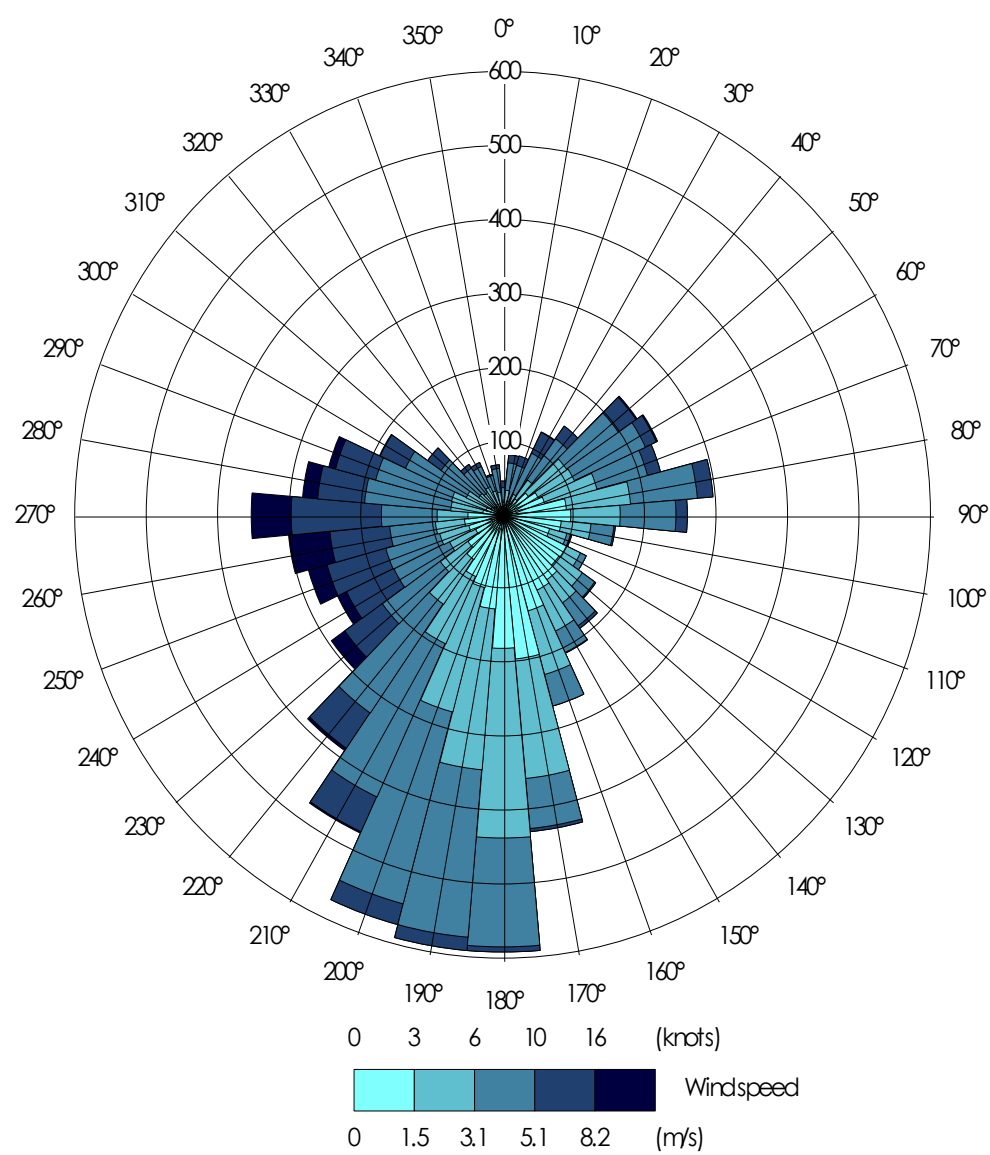
Statistical parameter	Comments
	This statistic can be particularly useful when comparing a large number of model and observed data points.

To assess the uncertainty of a model, the RMSE is the simplest parameter to calculate providing an estimate of the average error of the model in the same units as the modelled predictions. It is also often easier to interpret the RMSE than the other statistical parameters and therefore it has been calculated in this assessment to understand the model uncertainty.

The overall weighted RMSE value calculated after verification was below 15% and therefore, the final predictions are considered to be acceptable.

Appendix F - Wind Rose for Manchester Airport (2023)

Wind Rose for Manchester Airport (2023)



Appendix G - Dispersion Modelling Results

Table G1 - Annual Mean NO₂ Concentration

Receptor	Future Do Minimum (µg/m ³)	Future Do Something (µg/m ³)	% of AQAL	Change (µg/m ³)	% of AQO	Impact
R1	18.5	18.7	0.70	0.3	Below 75% of AQO	Negligible
R2	14.9	15.0	0.20	0.1	Below 75% of AQO	Negligible
R3	30.4	31.2	1.85	0.7	76 - 94% of AQO	Slight
R4	30.5	31.2	1.80	0.7	76 - 94% of AQO	Slight
R5	17.6	17.8	0.55	0.2	Below 75% of AQO	Negligible

*Results are rounded to 0.1µg/m³

Table G2 - Annual Mean PM₁₀ Concentration

Receptor	Future Do Minimum (µg/m ³)	Future Do Something (µg/m ³)	% of AQAL	Change (µg/m ³)	% of AQO	Impact
R1	13.4	13.4	0.11	0.0	Below 75% of AQO	Negligible
R2	12.8	12.8	0.04	0.0	Below 75% of AQO	Negligible
R3	15.9	16.0	0.37	0.1	Below 75% of AQO	Negligible
R4	16.0	16.2	0.38	0.2	Below 75% of AQO	Negligible
R5	13.4	13.4	0.10	0.0	Below 75% of AQO	Negligible

*Results are rounded to 0.1µg/m³

Table G3 - Annual Mean PM_{2.5} Concentration

Receptor	Future Do Minimum (µg/m ³)	Future Do Something (µg/m ³)	% of AQAL	Change (µg/m ³)	% of AQO	Impact
R1	7.4	7.4	0.26	0.03	Below 75% of Concentration Target	Negligible
R2	7.1	7.1	0.10	0.01	Below 75% of Concentration Target	Negligible
R3	8.8	8.9	0.85	0.08	76 - 94% of Concentration Target	Negligible
R4	8.9	9.0	0.86	0.09	76 - 94% of Concentration Target	Negligible
R5	7.4	7.4	0.23	0.02	Below 75% of Concentration Target	Negligible

*Results are rounded to 0.1µg/m³