Air Quality Assessment

Elsa Road, Manchester

Seddon Construction Ltd

MAN.721.015.AQ.R.001.P02

Planning
Architecture
Geoenvironmental
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Permitting
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Air Quality Assessment	
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Non-Technical Summary

This report provides an assessment of potential air quality impacts relating to a proposed residential development located off Elsa Road, Levenshulme, Manchester.

The development has potential to cause impacts at nearby sensitive locations during the construction and operational phases. Impacts could arise due to fugitive dust emissions generated by construction activities and road traffic emissions generated during operation. Local emission sources also have potential to expose future site occupiers to an area experiencing poor air quality.

An Air Quality Assessment was required to determine the baseline conditions at the site, determine site suitability for the proposed end-use and to consider the significance of development led impacts.

Construction phase impacts were assessed in accordance with industry standard guidance to determine risk and identify necessary dust control measures. Assuming the implementation of the stated dust control measures, impacts relating to fugitive dust emissions were predicted to be not significant.

Operational road traffic impacts were modelled with and without the development in place, and results were assessed against industry standard criteria to determine the overall significance of operational phase impacts. The results indicated that operational impacts were not significant at all modelled sensitive locations in the vicinity of the site.

Additionally, a review of available baseline air quality sources indicates the site is not located in an area experiencing elevated pollutant concentrations. As such, exposure impacts were screened as not significant.

In summary air quality impacts and onsite pollutant exposure are deemed not significant and should not form a constraint to planning permission.

1 Introduction

1.1 Background

1.1.1 Enzygo Limited (Ltd) was commissioned by Seddon Construction Ltd to produce an Air Quality Assessment (AQA) in support of a planning application for a residential development located off Elsa Road, Levenshulme, Manchester, hereafter referred to as the 'Proposed Development'.

1.1.2 The Proposed Development comprises the construction of 50 new residential units, alongside access and landscaping.

1.1.3 Pollutant emissions associated with construction activities and traffic generated during operation have potential to cause impacts at sensitive locations within the vicinity of the site. Additionally, existing pollutant emissions in the surroundings may introduce future residential occupiers to an area of poor air quality.

1.1.4 The assessment evaluates the significance of impacts associated with fugitive dust emissions generated by construction processes and road traffic emissions generated during the operation phase. It also determines site suitability with relation to pollutant concentrations from local emission sources and details recommended best practice mitigation measures.

1.1.5 Details of the assessment methodology, assessment inputs, results and conclusions are presented within this report.

1.2 Site Location and Context

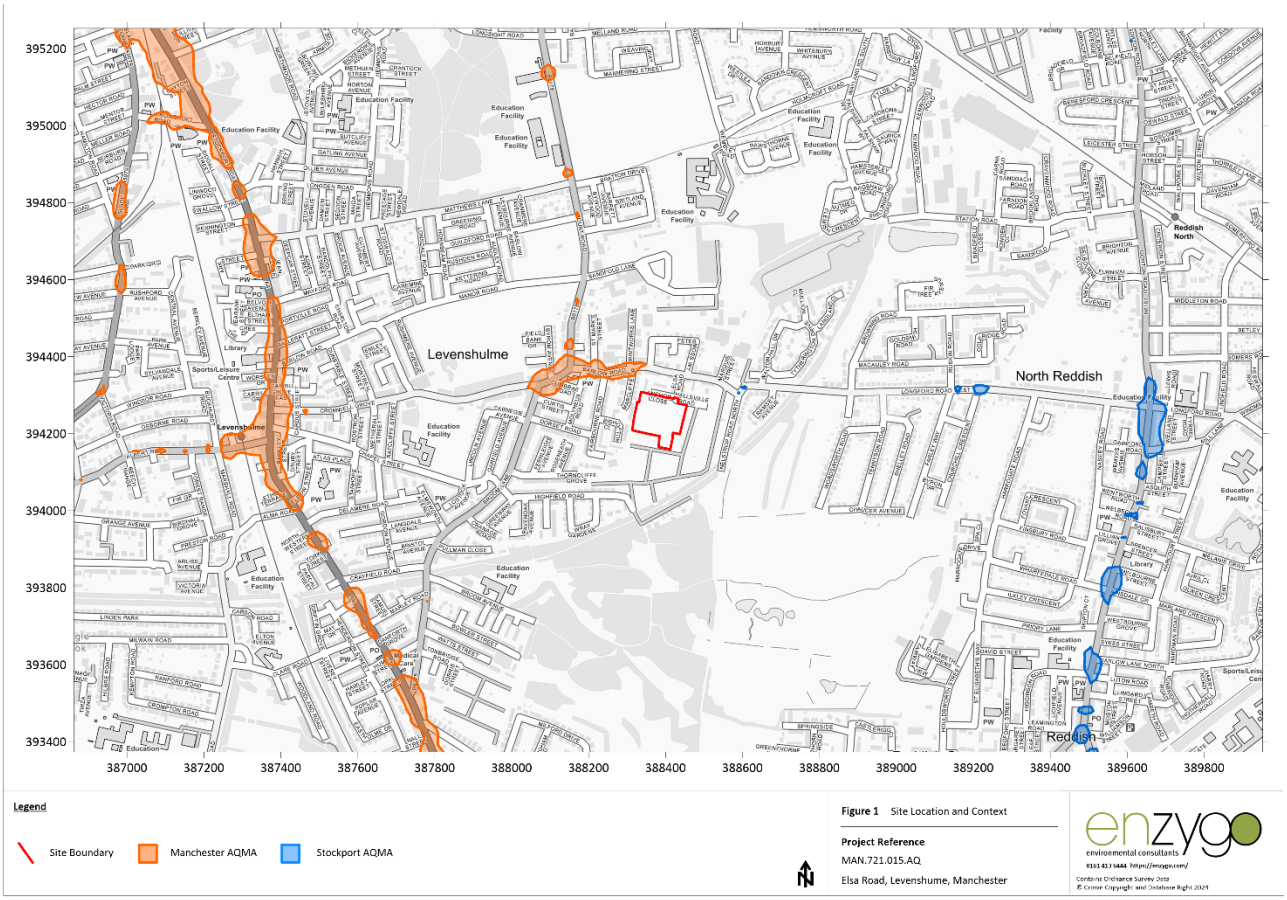
1.2.1 The Proposed Development is located at the approximate National Grid Reference (NGR): 388380, 394240, set within a well-established residential area.

1.2.2 The site is bound to the north and west by residential properties along Anchor Close and Marcliffe Drive/ Bishopton Close respectively, and to the south and east by Levenshulme Allotments. Further to the west and south are areas of woodland and well-established residential areas. The nearest major road to the proposed development is A6 (Stockport Road), located approximately 900m west of the site.

1.2.3 A desk top review of the surrounding area identified two Air Quality Management Areas (AQMA) close to the site. Due to this distance, impacts within the AQMA have been considered further in this assessment. No ecological designations were identified surrounding the proposed development.

1.2.4 Figure 1 below provides a view of the site boundary.

Figure 1 Site Boundary and Surrounding Context



2 Legislation, Guidance and Policy

The following legislation and guidance documents were considered during the preparation of the AQA.

- European Union (EU) Directive 2008/50/EC;
- The National Planning Policy Framework (NPPF), updated on 7th February 2025;
- The National Planning Practice Guidance (NPPG), relevant chapters produced on 1st November 2019;
- Section 82 of the Environment Act (1995) (Part IV);
- The Air Quality Standards (Amendment) Regulations (2016);
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Department for Environment, Food and Rural Affairs (DEFRA), 2023[1];
- Local Air Quality Management Technical Guidance (LAQM), DEFRA, August 2022[2];
- Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management (IAQM)[3]; and
- Land-Use Planning and Development Control: Planning for Air Quality Guidance, Environmental Protection UK and IAQM[4].

2.1 Legislation and National Strategy

2.1.1 Government policy requires the Secretary of State to publish a national Air Quality Strategy (AQS)[1]. The national AQS produced by DEFRA sets out the framework to reducing adverse impacts of air pollution upon human health, vegetation, and ecosystems. To achieve this the AQS defines air quality objectives (AQOs) for 10 key pollutant species, including nitrogen dioxide (NO_2), fine Particulate Matter (PM_{10} and $PM_{2.5}$) which are relevant to this assessment.

2.1.2 In accordance with the Environment Act (1995), Local Authorities (LAs) have an obligation to periodically review and assess air quality within their administration to determine if specified pollutants are exceeding relevant objectives. This review

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2023.
[2] Local Air Quality Management Technical Guidance 2022 LAQM.TG22, DEFRA, August 2022.
[3] Guidance on the Assessment of Dust from Demolition and Construction, IAQM, v2.2, January 2024.
[4] Land-Use Planning and Development Control: Planning for Air Quality, EPUK and IAQM, January 2017

involves the assessment of present and likely future air quality and is termed LAQM.

2.1.3 Should the LAQM process identify areas which are predicted to or currently exceeding relevant AQOs the LA is required to designate an AQMA. The AQMA is then accompanied by an Air Quality Action Plan (AQAP) which sets various measures and polices to improve air quality with the goal of restoring compliance with the AQOs. The process of LAQM is informed by DEFRAs Technical Guidance LAQM.TG22[2].

2.1.4 European Directive 2008/50/EC also sets out a similar approach to the AQS and defines limit values for the protection of human health and ecosystems. The Environmental Permitting (England and Wales) (Amendment) (EU Exit) Regulations 2019 ensures that the Environmental Permitting (EP) regime can continue following the UKs exit from the European Union (EU).

2.1.5 The regulations state also that exceedances of the objectives should be assessed in relation to air quality 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".

2.1.6 AQOs applicable to this assessment are summarised in Table 1 with relation to human health receptors. It should be noted that site suitability was determined using these objectives.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objectives	
	Concentration (µg/m³)	Averaging Periods
NO_2	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
PM_{10}	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year
$PM_{2.5}$	20	Annual mean

2.1.7 LAQM TG22 specifies locations where the AQOs should be applied as detailed in Table 2.

Table 2 Where Air Quality Objectives Apply Quality Objectives

Averaging Period	Objectives Should Apply At	Objectives Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed, including building façades of residential properties, schools, hospitals, care homes etc.	Building facades of offices and places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	As above, together with hotels and gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	As above and Kerbside sites such as pavements of busy shopping streets, parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more, and any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.1.8 The proposed residential use is to all averaging periods detailed above.

2.2 Local Planning Policy

Manchester City Council Core Strategy

2.2.1 The Core Strategy[5] was adopted by Manchester City Council on 11th July 2012. It is the key document in Manchester's Local Development Framework and covers a period of 15 years from 2012 to 2027. A review of the Local Plan indicated the following policies and objectives in relation to air quality that are relevant to this assessment:

[5] Core Strategy Development Plan Document, Manchester City Council, July 2012

Policy EN 16: Air Quality:

The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new development the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas.

Places for Everyone Joint Development Plan 2022 – 2039

2.2.2 The Places for Everyone Joint Development Plan[6] was adopted on the 21st March 2024. Places for Everyone is a long-term plan of nine Greater Manchester districts (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan) for jobs, new homes, and sustainable growth. This plan sets out how the borough should develop up until 2039. Policies relevant to air quality are detailed below.

Policy JP-S5: Clean Air

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

1. *Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;*
2. *Determining planning applications having regard to the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;*
3. *Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data so that adverse impacts on air quality can be fully assessed and development only*

[6] Places for Everyone Joint Development Plan Document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan, Greater Manchester Combined Authority, March 2024

permitted where they are acceptable and/or suitable mitigation can be provided;

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

2.2.3 In accordance with the relevant policies, consideration has been made to the significance of development led impacts upon human and ecological receptor locations associated with construction dust and road vehicles exhaust emissions generated by the Proposed Development.

3 Methodology

3.1 Scope

3.1.1 Emissions generated by the Proposed Development during the construction have potential to cause impacts at existing sensitive locations. Additionally, NO_2, and fine PM emissions associated with the local road network may introduce future site occupiers to an area of existing poor air quality. Potential impacts were assessed in accordance with the following assessment steps:

- Baseline Assessment;
- Construction Phase Fugitive Dust Impact Assessment;
- Onsite Exposure Assessment; and
- Offsite Operational Phase Impact Assessment.

3.1.2 The assessment approach also accords with the methodology detailed in IAQM planning guidance[3&4].

3.2 Baseline Assessment

3.2.1 Baseline conditions within the assessment extents were determined by a review of the latest Air Quality Status Report (ASR)[7] and monitoring data[8] produced by the GMCA as well as predicted background pollutant concentrations produced by DEFRA.

3.2.2 With regards to the assessment area, this comprises an area extending approximately 1 km from the application boundary which includes major road traffic emission sources and representative MCC air quality monitoring sites.

3.3 Construction Phase Impacts

3.3.1 There is potential for fugitive dust impacts to occur at existing sensitive locations as a result of demolition, earthworks, construction and trackout activities during the construction phase of the Proposed Development. A qualitative assessment was undertaken in accordance with the methodology outlined within the IAQM document[3].

3.3.2 The assessment identified specific control measures to be implemented on site which aim to reduce residual fugitive dust impacts. Appendix 3 provides the IAQM methodology.

[7] 2024 Air Quality Annual Status Report, Greater Manchester Combined Authority, June 2024
[8] https://cleanairgm.com/data-hub/monitoring-reports

3.4 Operational Phase Impacts

3.4.1 Dispersion modelling using the ADMS-Roads model (version 5.1.0.2) was prepared in two stages, including model verification against local air quality monitoring results for 2024, and future year predictions during the anticipated completion year of 2027.

3.4.2 ADMS is developed by Cambridge Environmental Research Consultants (CERC) and routinely used throughout the UK for the prediction of pollutant dispersion from road sources. The modelling inputs including traffic flow data, emission factor inventories, and meteorological data which are detailed in Appendix 1.

Off-Site Impacts

3.4.3 The operational phase will generate additional traffic on the local road network which may cause increases in pollutant concentrations at sensitive receptors adjacent to affected roads.

3.4.4 Potential road vehicle exhaust impacts with vehicles travelling to and from the site were initially screened against the critters contained within the EPUK and IAQM guidance[4] to determine the likely significance of impacts and where detailed assessment work is necessary. The guidance provides the following assessment thresholds with regards operational phase impacts:

- Proposals that will cause a change in Light Duty Vehicles (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) close to or within an AQMA; and
- Proposals that will cause a change in Heavy Duty Vehicle (HDV) flows of more than 25 AADT close to or within an AQMA.

3.4.5 Based on the information provided by the appointed transport consultant, Eddison's, the Proposed Development is anticipated to generate AADT flow of 277 and will exceed the assessment criteria stated above.

3.4.6 As such, NO_2 and PM concentrations were predicted at sensitive discrete receptors, with and without the development in place, along the roads where anticipated development traffic is anticipated to exceed the above thresholds. The following scenarios were assessed:

- 2024 as baseline year for verification against latest ratified data;
- Opening year do-minimum (DM) – Predicted traffic flows for 2027 should the Proposed Development is not completed; and
- Opening year do-something (DS) – Predicted traffic flows for 2027, with addition of traffic flows generated by the Proposed Development.

3.4.7 Baseline traffic flows were obtained from the DfT network and include both light duty vehicles (LDV) and HDV flows. TEMPRO v8 growth factors were applied to

various traffic links to take account of forecasted growth between 2024 and 2027 which represents the most recent baseline year and anticipated future development year.

EPUK and IAQM Impact Significance Criteria

3.4.8 Receptors potentially sensitive to changes in pollutant concentrations will be identified within the assessment extents and defined using the guidance provide in LAQM.TG22[2]. The impact at each receptor will be defined in accordance with EPUK and IAQM guidance[4] criteria shown in Table 3.

Table 3 EPUK and IAQM Assessment Impact Criteria

Long Term Average Concentration	% Change in Concentration Relative to AQO			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial

3.4.9 The criteria shown above provides descriptors to allow comparisons of various air quality impacts. It should be noted that changes of 0%, i.e. less than 0.5%, will be described as negligible.

3.4.10 Following the prediction of impacts at discrete receptor locations the EPUK and IAQM guidance[4] states that this framework is to be used as a starting point to make a judgement on significance of effect. The guidance suggests that any judgement on the overall significance of effect of a development will need to take into account such factors as:

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

3.4.11 These factors were considered, and an overall significance determined for the impact of operational phase road traffic emissions. It should be noted that the determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.

3.4.12 Full details of inputs utilised in the modelling assessment exercise and subsequent results are presented in Appendix 1 and Appendix 2, respectively.

On Site Impacts

3.4.13 The suitability of the site with regards to future pollutant exposure was determined by a review of the latest air quality monitoring data and location of receptors in relation to local emission sources. Air Quality monitoring undertaken by GMCA within the study area was compared against the national AQOs detailed in Table 1 to determine the likelihood of exposure impacts across the site.

3.4.14 Table 4 provides a summary of which AQOs apply across the Proposed Development.

Table 4 Relevant Air Quality Objectives

Land Use	Applicable AQOs
Residential (Class C3)	Annual mean
	1-hour mean
	24-hour mean

3.4.15 Any exceedance of the AQOs at proposed sensitive receptor locations was determined a significant impact.

4 Baseline Conditions

4.1 Introduction

4.1.1 Available air quality data and the surrounding context was reviewed to provide a baseline for assessment. The following sources were used in the assessment of baseline conditions:

- DEFRA's LAQM Background Mapping Data[9]
- DEFRA's AQMA Database[10];
- GMCA's 2024 ASR[7]; and
- Greater Manchester Clean Air Plan[8]

4.2 Emission Sources

4.2.1 The primary sources of pollutant emissions near the Proposed Development are exhaust emissions from road vehicles, particularly along Barlow Road which runs approximately 50 m north of the site, as well as the A6 (Stockport Road) which is located 900 m west of the site.

4.3 Air Quality Management Areas

4.3.1 As required by the Environment Act (1995), MCC and Stockport Metropolitan Borough Council (SMBC) undertake an annual review and assessment of air quality across their boroughs. This process indicated that roadside annual mean NO_2 concentrations currently exceed the relevant AQO at one areas across each borough which are described as:

- "Manchester AQMA – This is the part of the Greater Manchester Combined Authority AQMA located within the Manchester City Council area".
- "Stockport AQMA – This is the part of the Greater Manchester Combined Authority AQMA located within the Stockport Metropolitan Borough Council area".

4.3.2 Sections of Manchester and Stockport AQMAs are located along Barlow Road and the A6. Traffic generated by the proposed development could therefore affect these locations and has been considered further within the operational phase assessment.

[9] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021
[10] https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=43

4.3.3 As the site set back approximately 50m from the Barlow Road and 900 m from the A6 it was determined that elevated concentrations within the AQMA are unlikely to impact on site conditions and future amenity.

4.3.4 MCC and SMBC have concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs and as such no further AQMAs have been designated.

4.4 Air Quality Monitoring

4.4.1 A review of GMCA ASR[7] indicated no automatic stations close to the site, with the closest station located at Manchester Oxford Road approximately 5 km from the site. GMCA also monitor annual mean NO_2 concentrations using passive diffusion tubes, with three monitors located within approximately 1 km of the Proposed Development adjacent to the A6. It is considered that these sites could be used as a reasonable representation of the Proposed Development surroundings. Recent monitoring data is presented in Table 5.

Table 5: Diffusion Tube Monitoring Results

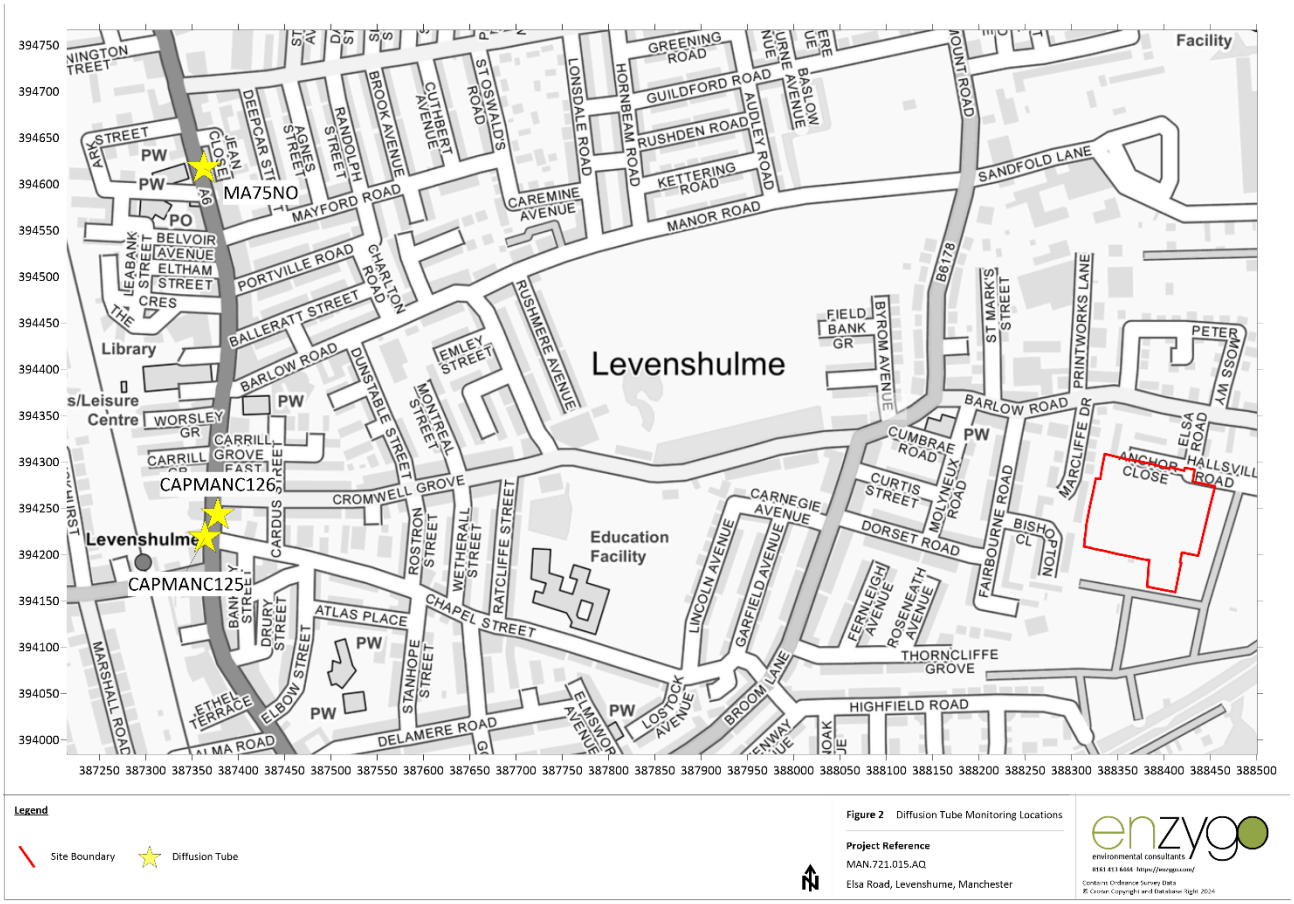
Site ID	Location	Type	Distance to Site (m)	Annual Mean Concentration (µg/m³)			
				2021	2022	2023	2024
MANC126	Stockport Road	Roadside	997	-	**41.1**	**42.4**	**40.7**
MANC125	Stockport Road	Roadside	1,011	-	**51.4**	**48.0**	**47.5**
MA75NO	Stockport Road	Kerbside	1,078	39.0	38.8	39.6	37.2

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

4.4.2 Recent NO_2 diffusion tube monitoring results indicate exceedances of the annual mean AQO at two sites within 1m of the A6 carriageway. It is noted that the site is set back from the A6 and similar concentrations are not expected. Analysis of the other monitors indicates a trend of overall improvement across the area.

4.4.3 Figure 2 presents the diffusion tube monitoring locations within the assessment extents.

Figure 2 Diffusion Tube Monitoring Results



4.5 DEFRA Background Concentrations

4.5.1 To assist LAs in their air quality review and assessments, DEFRA have produced background concentration maps for NO_2, PM_{10}, and $PM_{2.5}$. Predictions are based on a 1 km by 1 km grid basis across the entire UK with Proposed Development located in NGR: 388500, 394500.

4.5.2 Data for this grid square was downloaded for the most recent baseline year of 2024 and the anticipated opening year of 2027. Table 6 presents the data.

Table 6 DEFRA Background Pollutant Concentrations

Pollutant	Annual Mean Concentration (µg/m³)	
	2024	2027
NO_2	14.66	12.63
PM_{10}	12.63	12.39
$PM_{2.5}$	7.75	7.51

4.5.3 Based on DEFRA predictions, background concentrations of NO_2 are not expected to exceed their relevant AQOs during the current or future year with background concentrations predicted well below the AQOs.

4.5.4 The data also indicates the concentrations are predicted to decrease further in future years and suggest an improvement to local air quality.

4.5.5 A summary of background concentrations applied across the study area, including the site, monitoring locations and receptor locations are summarised in Appendix A.

4.6 Sensitive Receptors

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

Construction Phase Sensitive Receptors

4.6.2 No national or European ecological designations are located within 50 m of the Site boundary, or 50 m from a route used by construction vehicles on the public highway (up to 250 m from the Site entrance). Therefore, the risk of dust effects at a nationally or European designated ecological receptor site from construction impacts is not considered further in this assessment.

4.6.3 Human receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 250 m from the development boundary. These are summarised in Section 5.1.

4.6.4 Reference should be made to Figure 4 and Figure 5 within Appendix A for a graphical representation of construction phase dust buffer zones.

Operational Phase Sensitive Receptors

4.6.5 A desk-top study was undertaken to identify worst case sensitive receptor locations adjacent to the affected road network. Locations have been selected based on the distribution of traffic generated by the Proposed Development, as provided by the traffic consultant, Eddisons.

4.6.6 The majority of receptor locations represent residential premises where members of the public might reasonably be expected to spend one hour or more. The identified receptor locations are summarised in Table 7 and presented in Figure 3.

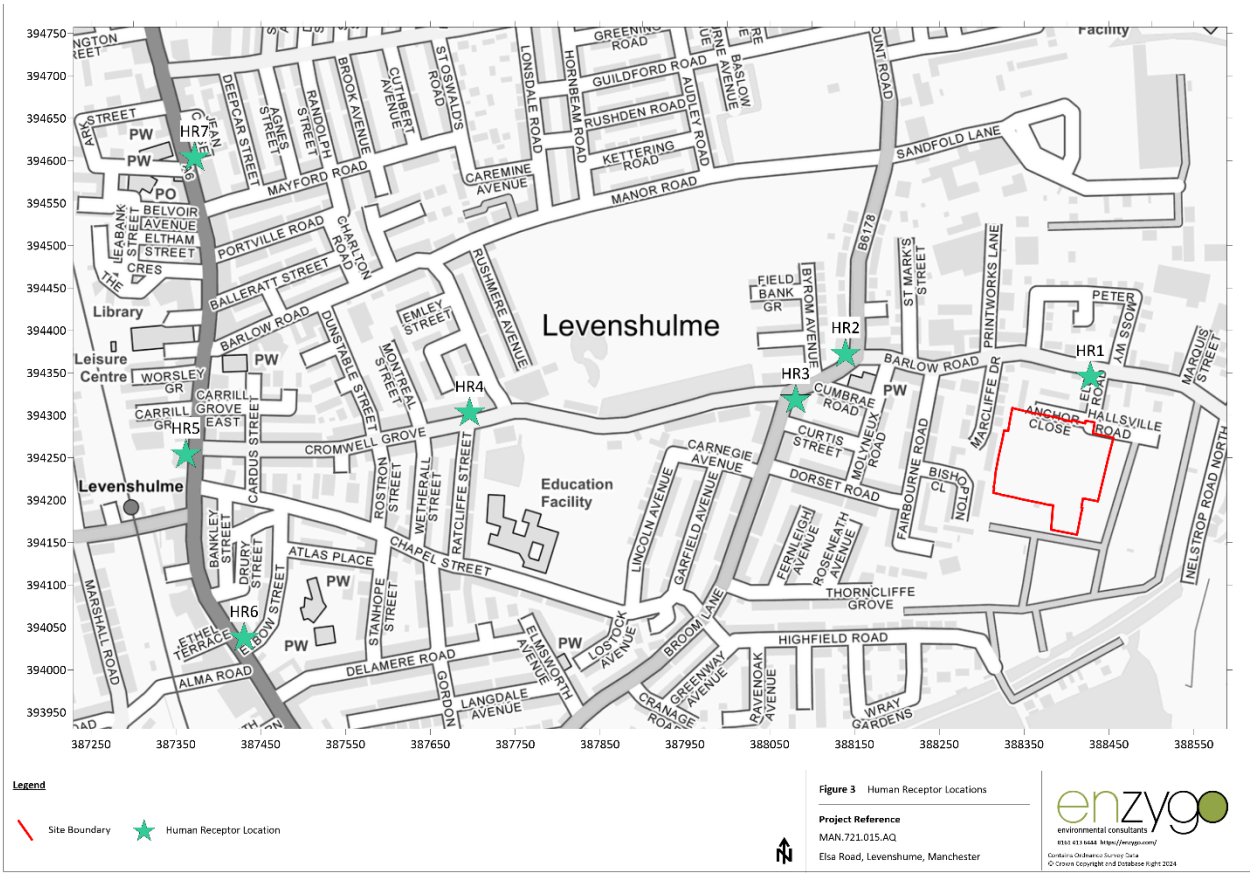
Table 7 Existing Human Sensitive Receptors

Receptor Name		Land Use	NGR (m)		Height (m)
			X	Y	
HR1	334 Barlow Road	Residential	388428	394345	1.5
HR2	318 Mount Road	Residential	388139	394372	1.5
HR3	256 Broom Lane	Residential	388081	394318	1.5
HR4	78 Cromwell Grove	Residential	387696	394303	1.5

Receptor Name		Land Use	NGR (m)		Height (m)
			X	Y	
HR5	908 Stockport Road	Residential	387362	394254	1.5
HR6	905 Stockport Road	Residential	387430	394038	1.5
HR7	743 Stockport Road	Residential	387372	394604	1.5

4.6.7 Receptors modelled at 1.5 m to represent the average Uk "breathing height" above ground level. Receptors modelled at heights above this level represent upper floors. Figure 3 presents the modelled operational phase human receptor locations.

Figure 3 Modelled Receptor Locations



5 Assessment

5.1 Construction Phase Impact Assessment

5.1.1 A desk top screening assessment (Step 1) identified sensitive receptors within 250 m of the site boundary, and within 50 m of the anticipated trackout extending 250 m from the site access. Construction impacts on human receptors are summarised in Table 8

Table 8 Construction Phase Sensitive Receptor Counts

Distance from Site or Trackout Routes (m)	Approximate Number of Receptors
Earthworks and Construction	
Less than 20	10 – 100
20 – 50	More than 100
50 – 100	More than 100
100 – 250	More than 100
Trackout	
Less than 20	10 – 100
20 – 50	More than 100

5.1.2 A detailed assessment of potential dust impacts was therefore required which is described in the following sections. Figure 4 and Figure 5 provide maps of the construction and trackout buffer distances.

Figure 4 Earthworks and Construction Buffer Distances

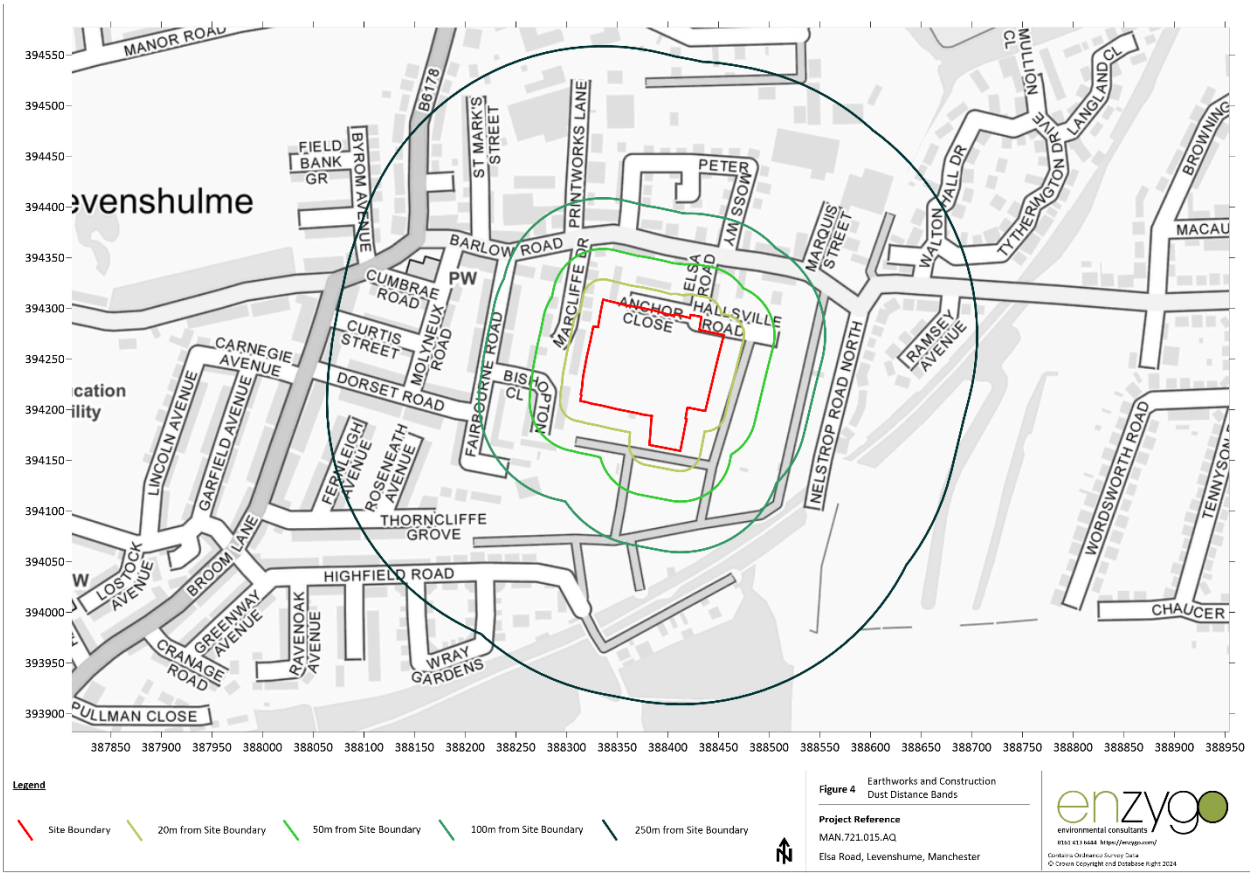
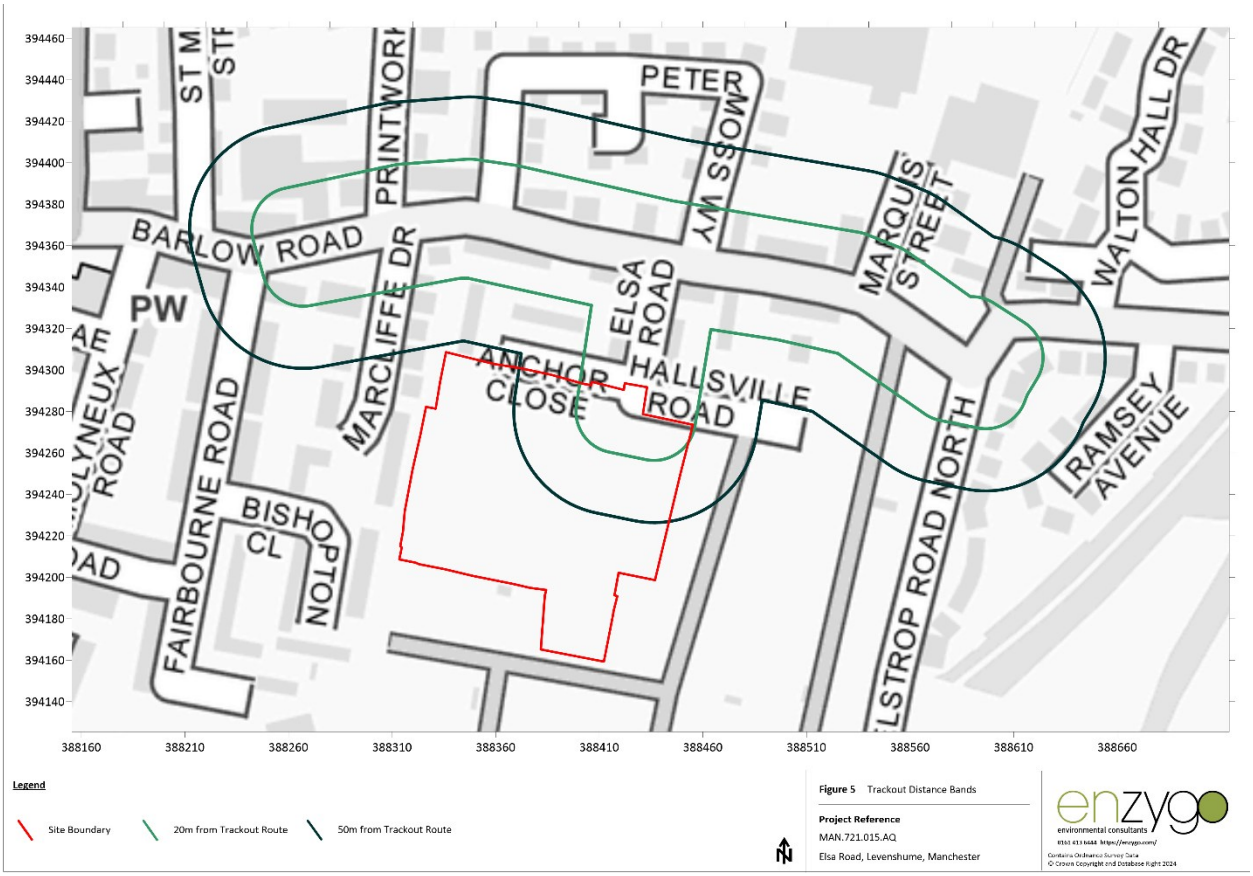


Figure 5 Trackout Buffer Distances



5.2 Magnitude

5.2.1 The scale and nature of the works has been determined to assess the magnitude (Step 2A) of fugitive dust emissions arising from each construction phase activity. The determination of magnitude was based upon the criteria detailed in Appendix C. A summary of the construction phase magnitudes is detailed in Table 9.

Table 9 Dust Emission Magnitude

Activity	Magnitude	Justification
Demolition	-	No demolition require to prepare site for construction
Earthworks	Small	Total site area less than 18,000m^2
Construction	Medium	Total building volume 12,000m^3 to 75,000m^3
Trackout	Medium	Unpaved road length between 50 to 100 m

5.3 Sensitivity of the Area

5.3.1 The next step (Step 2B) determined the sensitivity of the surrounding area, based on the number, proximity, and type of receptors. To ensure a worse case assessment all receptors were assumed to be highly sensitive (e.g. residential). The sensitivity of the area to dust impacts is summarised in Table 10.

Table 10 Summary of Area Sensitivity to Dust Impacts

Activity	Magnitude	Justification
Dust Soiling		
Demolition	-	No demolition require to prepare site for construction
Earthworks	High	Residential are located directly adjacent to the site boundary and provide high receptor sensitivity. When combined with receptor counts provided in Table 8 the sensitivity of the surrounding area is high for all activities.
Construction		
Trackout		
Human Health		
Demolition	-	No demolition require to prepare site for construction
Earthworks	Low	Annual mean background concentrations of PM_{10} are 12.63 µg/m^3 (Table 6). Based on the receptor counts provided in Table 8, the sensitivity of the surrounding area is low for all activities.
Construction		
Trackout		

5.4 Risk

5.4.1 The next stage of the assessment (Step 2C) combined the dust magnitude and receptor sensitivity defined above to determine the overall risk with no mitigation applied. This is summarised in Table 11.

Table 11 Summary of Unmitigated Dust Risk

Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	-	Low	Medium	Medium
Human Health	-	Negligible	Low	Low

5.4.2 Following the determination of risk for each activity, the final step (Step 3) detailed necessary mitigation measures to reduce impacts during the construction phase. These measures have been adapted for a 'medium' risk site and summarised in Section 6.1.

5.5 On-site Exposure

Long Term Objectives

5.5.1 Opening year pollutant concentrations were modelled across the Proposed Development during the future opening year of 2027. Results are presented in Table 12, which present the range of concentrations across the site. The maximum concentrations were predicted at non-sensitive proposed uses on the site directly adjacent to Elsa Road.

Table 12 Predicted Annual Mean Concentrations Across the Site

Receptor Location	Maximum Concentration (µg/m³)		
	NO_2 (AQO: 40 µg/m³)	PM_{10} (AQO: 40 µg/m³)	$PM_{2.5}$ (AQO: 25 µg/m³)
Site	14.6	12.9	7.9

5.5.2 Predicted annual mean concentrations presented in Table 12 indicate compliance with national AQOs detailed in Table 1 . Based on these results, on-site exposure to annual mean pollutant concentrations was considered not significant and the site is considered suitable for residential use without the requirement of protective mitigation measures.

5.5.3 Predictions at heights above first floor have not been assessed, as pollutant concentrations reduce with increased height from emission sources, i.e., the local road network.

5.6 Short Term Objectives

5.6.1 Exposure to 1-hour NO_2 or 24-hour PM_{10} concentrations are relevant at the Proposed Development site but modelling was not undertaken. As an alternative, LAQM.TG22 states if annual mean NO_2 concentrations are below 60 µg/m³ and PM_{10} concentrations below 32 µg/m³ then it is unlikely that the short term AQOs will be exceeded.

5.6.2 Based on the annual mean concentrations presented in Table 12 the 1 hour and 24-hour AQOs are not predicted to exceeded at any location across the site.

5.7 Road Traffic Exhaust Impacts

5.7.1 Based on the anticipated AADT trip generation a dispersion modelling assessment was undertaken to quantify potential changes in pollutant concentrations at sensitive locations across the affected road network.

5.7.2 Predicted impact significance at individual receptors on annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations, based on the criteria given in Table 4, are summarised in Table 13.

Table 13 Summary of Operational Phase Impacts

Pollutant and Period	Receptors	Impact Descriptor
Annual Mean NO_2	All Receptors	Negligible
Annual Mean PM_{10}	All Receptors	Negligible
Annual Mean $PM_{2.5}$	All Receptors	Negligible

5.7.3 As shown in Table 13 the significance of impacts was predicted to be negligible at all sensitive receptors.

5.7.4 The overall significance of potential impacts was determined to be not significant in accordance with the EPUK and IAQM guidance[3]. Full assessment results and commentary can be found in Appendix 2, with justifications provided in Table 14.

Table 14 Overall Road Emissions Impact Significance

Guidance	Comment
Number of properties affected by slight, moderate or substantial air quality impacts and a judgement on the overall balance	Impacts on NO_2, PM_{10} and $PM_{2.5}$ concentrations were predicted to be negligible at all sensitive receptors. These represent worst-case locations and therefore it is unlikely that any other receptors would be significantly affected by the Proposed Development.
Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant	The Proposed Development will not result in any new sensitive exposure to pollutant concentrations above the AQOs at sensitive locations
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	The maximum changes in annual mean for NO_2, PM_{10} and $PM_{2.5}$ concentrations relative to their respective AQOs were predicted to range from: • 0.15% to 0.40% for NO_2, • 0.05% to 0.23% for PM_{10}; and • 0.05% to 0.25% for $PM_{2.5}$. Resultant impacts were therefore negligible at all receptor locations for each pollutant species

Guidance	Comment
Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease	There were no predicted exceedances of the annual mean AQOs for NO_2, PM_{10} or $PM_{2.5}$ at any sensitive receptor location within the modelling extents
The extent to which an objective is exceeded e.g. an annual mean NO_2 concentration of 41µg/m^3 should attract less significance than an annual mean of 51 µg/m^3	As above, there were no predicted exceedances at any receptor locations within the modelling extents, and impacts should attract less significance.

5.7.5 Based on the above analysis the overall operational phase road traffic emission impacts were determined as not significant.

6 Mitigation

6.1 Construction Phase

6.1.1 The IAQM Guidance provides several control measures to reduce fugitive dust impacts during the construction phase. These measures have been adapted based on professional judgement for the Proposed Development site and summarised below.

Communications

- A stakeholder communications plan will be developed and implement that includes community engagement before work commences on site; and
- The name and contact details of person(s) accountable for air quality and dust issues will be displayed on the site boundary alongside the head/regional office contact information;
- The contact information of the head or regional office will be displayed;
- A Dust Management Plan (DMP) will be developed and implement which may include measures to control other emissions, approved by the Local Authority.

Site Management

- All dust and air quality complaints will be recorded. This will identify causes, and measures to reduce emissions will be undertaken in a timely manner;
- The complaints log will be made available to the local authority when asked;
- Any exceptional incidents that cause dust and/or air emissions will be recorded and the action taken to resolve the situation will be recorded in the log book; and
- Regular liaison meetings with other high-risk construction sites within 500 m of the site boundary will be held to ensure plans are co-ordinated and dust and particulate matter.

Monitoring

- Regular site inspections will be undertaken to monitor compliance with the DMP
- Inspection results will be recorded, and made available to the local authority when asked

- Inspections will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Dust deposition, dust flux and PM10 continuous monitoring locations will be agreed with the local authority. Baseline monitoring will commence three months before work on each phase commences.

Preparing & Maintaining Site

- The site layout will be planned so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Solid screens or barriers will be erected around dusty activities or the site boundary;
- Specific operations which have a high potential for dust production will be enclosed;
- Site runoff of water or mud will be avoided as far as practical;
- Site hoarding, barriers and scaffolding will be kept clean using wet methods;
- Materials that have a potential to produce dust will be removed from site as soon as possible, unless being re-used on site. If they are being re-used on-site stockpiles will be bunded and covered to prevent wind whipping and will be located as far away from existing receptors where possible; and
- Stockpiles will be covered when necessary to prevent wind whipping.

Operating Vehicle/Machinery & Sustainable Travel

- All on-road vehicles will comply with the requirements of the London Low Emission Zone and the London NRMM standards
- All vehicle engines will be switched off when stationary to avoid idling;
- The use of diesel or petrol powered generators will be avoided where practicable;
- Vehicles speeds will be reduced on site, and If practicable, a site-specific and enforceable speed limit will be set.
- A Construction Logistics Plan will be produced to manage the sustainable delivery of goods and materials;
- A travel plan encouraging sustainable transport will be implemented.

Operations

- Cutting of silica materials (bricks, blocks, concrete , tiles etc) will be carried out with mechanical saws fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation;
- Enclosed chutes, conveyors and covered skips will be used where possible;
- Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment will be minimised. If necessary fine water sprays on such equipment will be used;
- Equipment to clean dry spillages and clean up spillages will be readily available on site; and
- All deliveries and exports of dusty materials will be in enclosed sheeted vehicles.

Waste Management

- Bonfires and burning of waste materials will be prohibited.

Earthworks & Construction

- Re-vegetate earthworks as soon as practicable, where not possible use hessian, mulches or trackifiers;
- Where it is not possible to re-vegetate or cover fine materials with topsoil, appropriate covers will be used;
- Only remove covers in small areas during work and not all at once
- Scabbling (roughening of concrete surfaces) will be avoided;
- Should sand and other aggregates be stored on site, they will be bunded, covered and are not allowed to dry out;
- Bulk cement and other fine powder materials delivered to site will be enclosed and stored with appropriate emission control systems to prevent escape of material and overfilling during delivery; and
- Smaller supplies of fine power materials will be sealed after use and stored appropriately to prevent dust.

Trackout

- Water-assisted dust sweeper(s) will be used on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Sweeping of large dry areas will be avoided;
- Vehicles entering and leaving sites will be covered to prevent escape of materials during transport;
- On-site haul routes will be inspected for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Hard surfaced haul routes will be regularly damped down during specific weather conditions with a fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- All inspections of haul routes and any subsequent action will be recorded in a site log book;
- A wheel washing system will be implemented with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable; and
- An adequate area of hard surfaced road between the wheel wash facility and the site exit will be provided wherever site area and layout permits; and
- •Access gates will be located at least 10m from receptors where possible.

6.1.2 Assuming the relevant mitigation measures outlined in above are implemented, the residual effect from all dust generating activities (Step 4) is predicted to be negligible and therefore not significant in accordance with the IAQM guidance.

6.2 Operational Phase

6.2.1 The results of operational phase assessment concluded that associated development impacts are predicted to be not significant, as a result of negligible impacts at all locations. Additionally, no exceedances of the AQOs were predicted at any location identified in the assessment.

6.2.2 As such, no mitigation measures are required make the proposals acceptable. However, principles of good practice listed in the IAQM Planning for Air Quality Guidance4 recommends the Proposed Development to include the following measures:

- Dwellings with dedicated spaces: One Electric Vehicle charging point for each residential unit;

- Dwellings with unallocated parking: One EV charging point per 10 parking spaces;
- Secure cycling parking;
- Provision of a travel plan which sets out measures to encourage sustainable means of transport; and
- All gas-fired boilers to meet a minimum standard of <40 mgNO_x/kWh

7 Conclusions

7.1.1 Enzygo Ltd was commissioned by Seddon Construction Ltd to produce an AQA in support of a planning application for a 50-unit residential development located off Elsa Road, Levenshulme, Manchester.

7.1.2 A qualitative construction dust risk assessment was undertaken in accordance with the IAQM methodology to assess impact risk and define a suitable mitigation strategy. Assuming good practice and the implementation of suggested dust control measures, detailed in Section 6.1, residual impacts are predicted to be not significant.

7.1.3 Potential impacts during the operational phase of the development may occur due to future exposure to pollution on the site and from additional NO_2 and fine PM emissions associated with vehicles travelling to and from the site. A dispersion modelling assessment was undertaken to quantify air quality impacts at sensitive locations. Results were verified using monitoring results obtained from GMCA.

7.1.4 The results of the site exposure modelling predicted that annual and hourly mean concentrations across the Proposed Development site comply with the national AQOs at all sensitive locations. Further mitigation to protect future occupiers is therefore not required and operational phase exposure was predicted to be not significant.

7.1.5 Impacts on NO_2, PM_{10} and $PM_{2.5}$ concentrations from development generated traffic were predicted to be negligible at all sensitive receptor locations within the vicinity of the site. The overall significance of potential impacts was determined to be not significant in accordance with the EPUK and IAQM guidance.

7.1.6 In summary, it is predicted that both development impacts and on-site pollutant exposure are deemed not significant and should not form a constraint to planning permission.

Glossary of Terms

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
ADMS	Atmospheric Dispersion Modelling Software
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
ASR	Annual Status Report
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do Minimum
DMP	Dust Management Plan
DS	Do Something
EA	Environment Agency
EPUK	Environmental Protection UK
EV	Electric Vehicle
EU	European Union
GMCA	Greater Manchester Combined Authority
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
MCC	Manchester City Council
NGR	National Grid Reference
NO_2	Nitrogen Dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PM_{10}	Particulate Matter with an aerodynamic diameter less than 10 mm
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter less than 2.5 mm
SMBC	Stockport Metropolitan Borough Council
UK	United Kingdom
z_0	Roughness Length

Appendix 1 Modelling Inputs

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.1.0.2) which is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the UK for the prediction of pollutant dispersion from road sources. The Environment Agency and DEFRA also accept modelling predictions from this software package.

The model requires input data that details the following parameters:

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

Traffic Flow Data

Development traffic flows were provided by the Eddison's, the appointed traffic consultants for the application, with baseline flows obtained from the Department for Transport (DfT) database, which is referenced in DEFRA guidance LAQM (TG22) as being a suitable source of data for air quality assessments.

Growth factors were obtained from the Trip End Model Presentation Program (TEMPro) v8.1 to convert 2024 baseline data to the future year assessment scenario of 2027.

Vehicle speeds were estimated based on the free flow potential of each link and local speed limits. Assumptions account for speed reductions at junctions and peak hour congestion in line with LAQM.TG22. Road widths were estimated from aerial and 3D photography provided by Google Earth Pro.

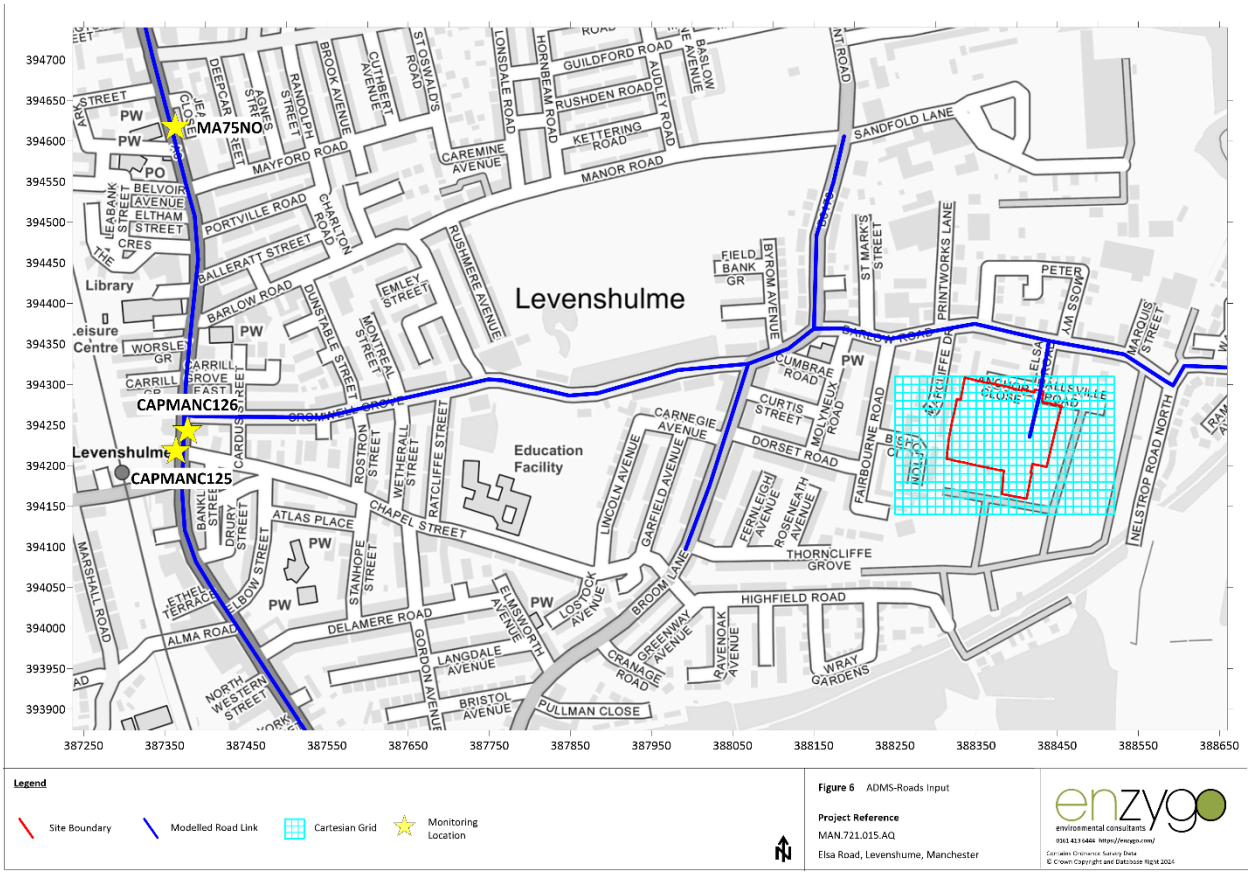
A summary of the traffic data used to inform model verification scenario and operational scenarios is presented Table A1.1.

Table A1.1 AADT Traffic Data

Road Link		Width (m)	Speed (km/h)	Verification Scenario (2024)		DM Scenario (2027)		DS Scenario (2027)	
				AADT	HGV%	AADT	HGV%	AADT	HGV%
L1	Site Access	5.0	8	0	0.0	0	0.0	277	0.0
L2	Elsa Road	6.5	16	337	0.0	345	0.0	345	0.0
L3	Barlow Road (East of Site Access)	6.5	35	10,083	1.8	10,334	1.8	10,389	1.8
L4	Barlow Road (West of Site Access)	8.0	30	10,083	1.8	10,334	1.8	10,556	1.8
L5	Barlow Road (West of Site Access) Slowdown	8.0	10	10,083	1.8	10,334	1.8	10,556	1.8
L6	Barlow Road (West of Mount Road)	9.6	40	10,083	1.8	10,334	1.8	10,556	1.8
L7	Mount Road	6.8	30	10,083	1.8	10,334	1.8	10,556	1.8
L8	Broom Lane	7.0	30	10,083	1.8	10,334	1.8	10,556	1.8
L9	Cromwell Grove	6.6	40	10,083	1.8	10,334	1.8	10,556	1.8
L10	Cromwell Grove Slowdown	7.5	10	10,083	1.8	10,334	1.8	10,556	1.8
L11	A6(Cromwell Grove Lights)	11.8	15	23,336	3.9	23,917	3.9	24,028	3.8
L12	A6 North of Cromwell Grove	8.0	40	23,336	3.9	23,917	3.9	24,028	3.8
L13	A6 North Lights	9.7	16	23,336	3.9	23,917	3.9	24,028	3.8
L14	A6 North of Woolfold Avenue	7.8	40	23,336	3.9	23,917	3.9	24,028	3.8
L15	A6 South of Cromwell Grove	8.6	40	23,336	3.9	23,917	3.9	24,028	3.8
L16	A6 South Lights	9.7	16	23,336	3.9	23,917	3.9	24,028	3.8
L17	A6 South of Delamere Road	6.8	40	23,336	3.9	23,917	3.9	24,028	3.8

Figure 6 presents the modelled road links used within the verification and operational phases of the ADMS model.

Figure 6 ADMS Model Inputs



Emission Factors

Emission factors for each link were calculated using the traffic flows detailed in Table A1.1 using the Emissions Factor Toolkit (EfT) (version 13.1) released in August 2024, which incorporates updated COPERT v5.8 vehicle emissions factors for NOx and PM.

The 2027 future scenarios assume a reduction to future year emission factors guided by increasing EV fleets and future advancements to low emission technologies as provided by the EfT.

Assessment Area

Ambient concentrations were predicted at existing receptor locations, presented in Figure 3, to quantify road vehicle exhaust emission impacts generated by the Proposed Development

Gridded outputs over the region NGR: 388250, 394140, 388520, 394310 were processed and combined with 2027 DEFRA background concentrations detailed in Table 6 to to assess pollutant exposure across the site.

NO_x to NO_2 Conversion

Predicted annual mean NOx concentrations from the dispersion model were converted to NO_2 concentrations using the NOx to NO_2 Calculator (v.9.1) provided by DEFRA, which is the method detailed within LAQM.TG22.

Meteorological Data

Hourly sequential data for 2024 was obtained from Manchester Airport meteorological station, located 12 km southwest of the Proposed Development. Figure 7 presents the 2024 wind rose.

Figure 7 Meteorological Wind Rose

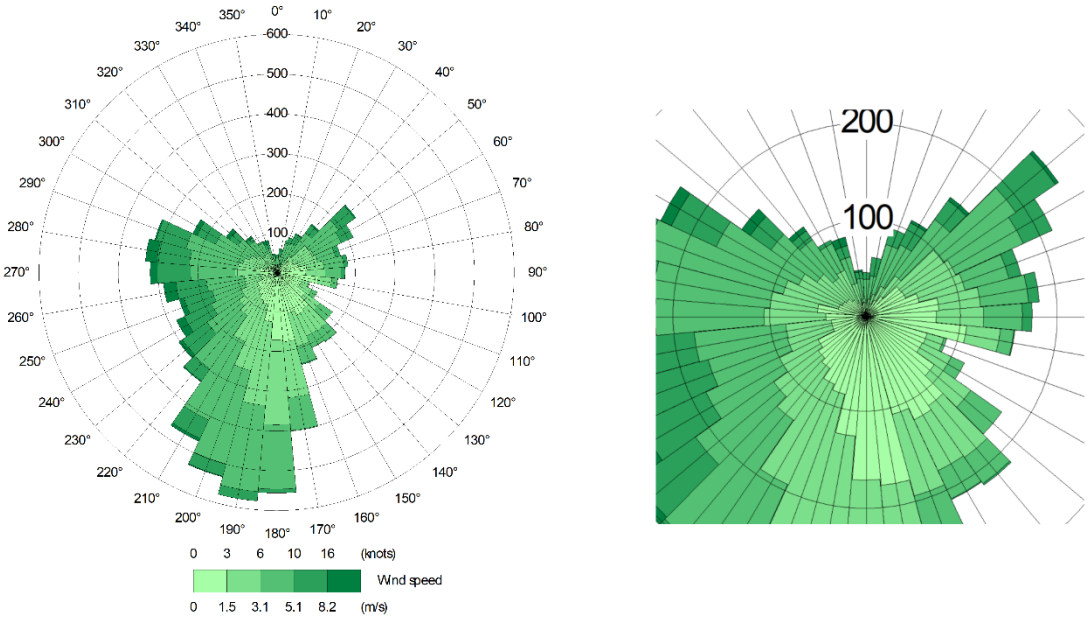


Figure 7 2024 Manchester Airport Meteorological Data

Project Reference
MAN.721.015.AQ
Elsa Road, Levenshulme, Manchester

The choice of data is considered suitable to represent meteorological conditions across the modelled domain. All meteorological data used in the assessment was provided by ADM Ltd.

Meteorological Parameters

The specific roughness length (z0) values specified with ADMS-Roads are summarised in Table A1.2.

Table A1.2 Roughness Lengths

Scenario	Roughness Length (m)	ADMS Description
All Assessment Scenarios, Met Stations	0.5	Parkland, open suburbia

The Monin-Obukhov length values are summarised in Table A1.3

Table A1.3 Monin-Obukhov Lengths

Scenario	Monin-Obukhov Length (m)	ADMS Description
All Assessment Scenarios and Met Station	30	Cities and Large Towns/ Mixed urban/industrial

Background Concentrations

Table A1.4 displays the specific baseline background concentrations as predicted by DEFRA, utilised to represent background conditions at model verification sites.

Table A1.4 Background Concentrations for Monitoring Locations

Monitoring Location	DEFRA Grid Square	Pollutant	Background Concentration (µg/m³)
All Sites	387500, 394500	NO_x	21.89
		NO_2	15.91

Table A1.5 displays the predicted 2027 background concentrations utilised in the operational phase to represent background conditions at model sensitive receptor locations.

Table A1.5 Predicted Concentrations at Sensitive Receptors

Receptor Location	DEFRA Grid Square	Pollutant	Background Concentration (µg/m³)
HR1 - HR3	388500, 394500	NO_x	16.89
		NO_2	12.63
		PM_{10}	12.39
		$PM_{2.5}$	7.51
HR4 - HR7	387500, 394500	NO_x	18.22
		NO_2	13.52
		PM_{10}	13.24
		$PM_{2.5}$	7.99

Similar to emission factors, background concentrations for 2027 were used to represent predicted background concentrations during the future year operation scenarios.

Verification

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

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;

- Variations in meteorological conditions;
- Overall model limitations; and
- Uncertainties associated with monitoring data, including locations.

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

For the purpose of this assessment model verification was undertaken for 2024, using traffic data, meteorological data, and monitoring results from this year. The verification process was undertaken at monitoring sites CAPMANC125, CAPMANC126 and MA75NO which were identified as the most representative of the affected and modelled road network. Background NO_2 concentrations used were taken from the DEFRA predicted background concentrations.

DEFRA guidance LAQM.TG22 advises that the verification should consider the performance of the model in predicting road sourced NOx. Reasonable efforts were made to optimise the accuracy of modelling across the assessment extents. In accordance with LAQM TG22 checks on traffic data, road widths, speed estimations were made to improve modelled roadside contributions.

Table A1.6 presents the adjusted model and comparison of monitored and predicted annual mean road NO_x concentrations produced using the initial modelling parameters.

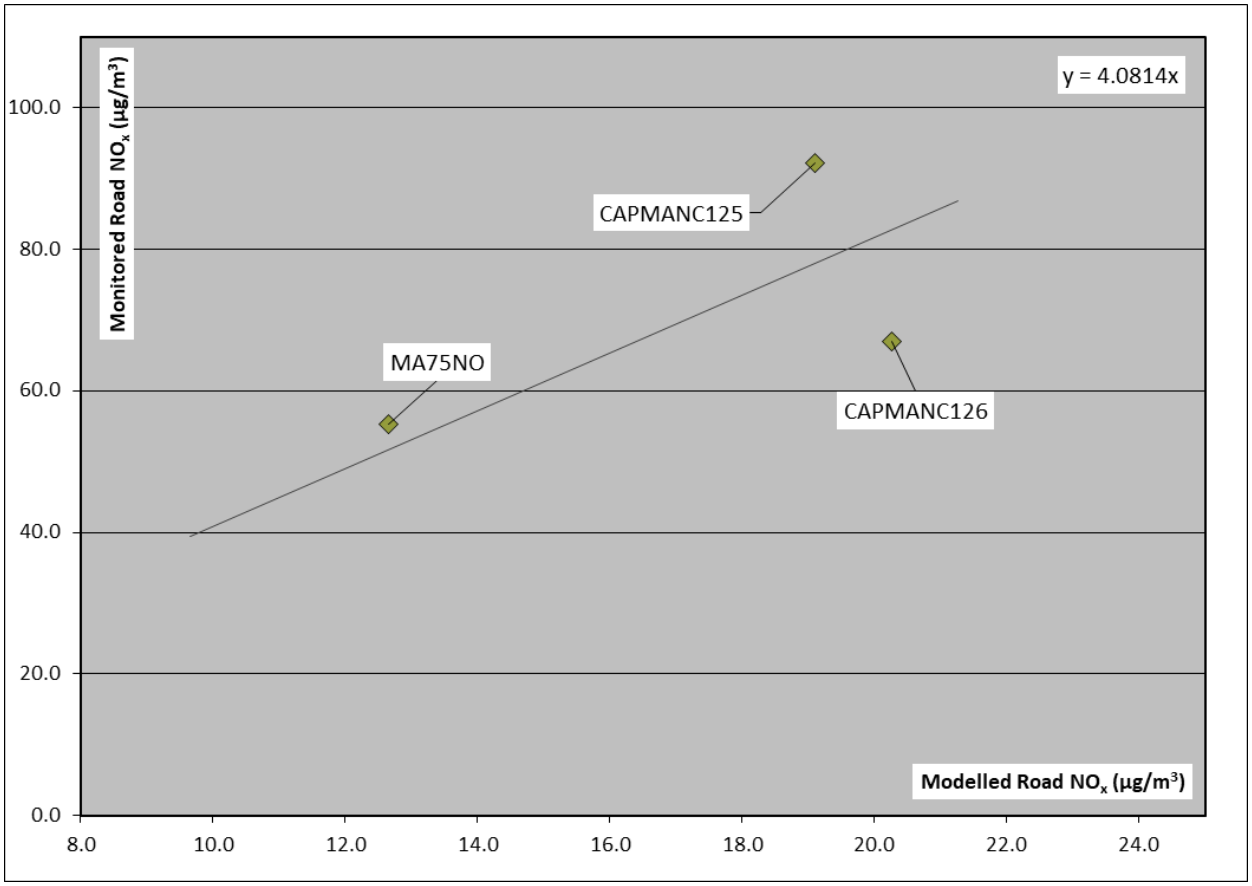
Table A1.6 Initial Modelled NO_x Results

Site ID	Monitored Road NO_x Concentration (µg/m³)	Modelled Road NOx Concentration (µg/m³)	% Difference
CAPMANC125	19.10	92.14	-79%
CAPMANC126	20.26	66.98	-70%
MA75NO	12.65	55.36	-77%

The modelled NO_x results indicated underpredictions of modelled NO_x concentrations at both locations. As reasonable efforts were made to reduce inaccuracies, including checks on traffic data, vehicle speed and the exact locations of the diffusion tubes, it was deemed appropriate to apply an adjustment factor to modelled concentrations to improve the overall accuracy of the model.

The monitored and modelled NO_x road contributions were therefore graphed and the equation of the trend line based on the linear progression through zero was calculated, as shown in Graph A1.

Graph A1 Modelled and Monitored NO_x Road Contributions



The adjustment factor of 4.0814 was applied to the modelled road NOx contributions with adjusted results presented in Table A1.7.

Table A1.7 Adjusted NO_x Results

Site ID	Monitored Road NOx Concentration (µg/m³)	Adjusted Modelled Road NOX Concentration (µg/m³)	Adjusted % Difference
CAPMANC125	92.14	77.94	-15%
CAPMANC126	66.98	82.69	23%
MA75NO	55.36	51.64	-7%

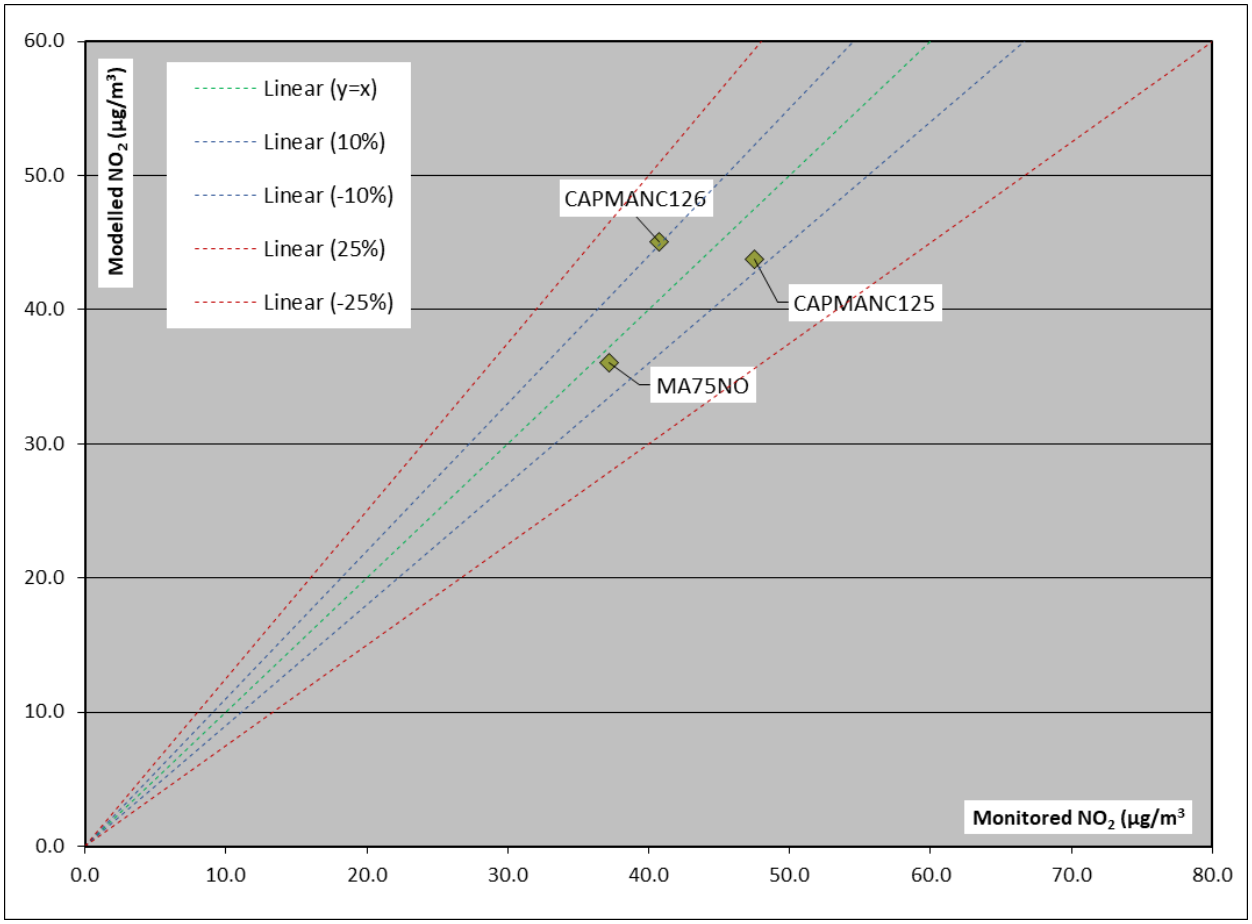
The adjusted modelled NO_2 concentrations are compared with the total monitored NO2 concentrations in Table A1.8. LAQM.TG22 recommends that modelled concentrations should be within 25% and ideally 10% of the monitored concentrations.

Table A1.8 Adjusted Modelled and Monitored NO_2 Concentrations

Site ID	Monitored NO_2 Concentration (µg/m³)	Adjusted Modelled NO_2 Concentration (µg/m³)	% Difference
CAPMANC125	47.50	43.8	-8%
CAPMANC126	40.70	45.1	11%
MA75NO	37.20	36.0	-3%

A graphical representation of the adjusted NO_2 concentrations is provided within Graph A2.

Graph A2 Comparison of NO_2 Concentrations



As demonstrated in Table A1.8 and Graph A2, modelled NO_2 concentrations following adjustment are within 25% at all locations. Importantly, the results also show no systematic tendency for the model to over or underestimate NO_2 concentrations.

Additional methods for determining model performance are provided below in accordance with Box 7.21 of LAQM.TG22[2] are presented in Table A1.9. This includes correlation coefficient; root mean square error and fractional bias.

Table A1.9 Model Performance

Method	Calculated Value	Ideal Value
Correlation Coefficient	0.67	1.00
Root Mean Square Error	3.37 (8.43%)	0.00 (<25%)
Fractional Bias	0.00	0.00

The adjustments provide favourable values which adheres to the guidance provided in LAQM .TG22 and suggest further post adjustment is unnecessary. As PM monitoring is not currently undertaken within the study area, the NO_x adjustment factor of 4.0814 was utilised to adjust model predictions of PM in accordance with the guidance provided within LAQM TG22.

Appendix 2 Results

Nitrogen Dioxide (NO_2)

Table A2.1 Predicted Annual Mean Concentrations

Potential Impact		Predicted Annual Mean Concentration (µg/m3)		
		DM	DS	Change
R1	334 Barlow Road	16.70	16.77	0.07
R2	318 Mount Road	21.13	21.29	0.16
R3	256 Broom Lane	21.46	21.62	0.16
R4	78 Cromwell Grove	21.58	21.72	0.14
R5	908 Stockport Road	32.57	32.70	0.13
R6	905 Stockport Road	30.94	31.00	0.06
R7	743 Stockport Road	33.12	33.23	0.11

Annual mean concentrations were below the relevant AQO at all receptor locations considered. Predicted impacts are summarised in Table A2.2.

Table A2.2 Predicted Impacts

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	IAQM Impact Descriptor
R1	334 Barlow Road	0.2	75% or Less	Negligible
R2	318 Mount Road	0.4	75% or Less	Negligible
R3	256 Broom Lane	0.4	75% or Less	Negligible
R4	78 Cromwell Grove	0.4	75% or Less	Negligible
R5	908 Stockport Road	0.3	76-94%	Negligible
R6	905 Stockport Road	0.1	76-94%	Negligible
R7	743 Stockport Road	0.3	76-94%	Negligible

Impacts on annual mean NO_2 concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be negligible at all receptor locations.

Particulate Matter (PM_{10})

Table A2.3 Predicted Annual Mean Concentrations

Potential Impact		Predicted Annual Mean Concentration (µg/m3)		
		DM	DS	Change
R1	334 Barlow Road	14.21	14.24	0.03
R2	318 Mount Road	16.26	16.34	0.08
R3	256 Broom Lane	16.60	16.69	0.09

Potential Impact		Predicted Annual Mean Concentration (µg/m3)		
		DM	DS	Change
R4	78 Cromwell Grove	17.29	17.37	0.08
R5	908 Stockport Road	20.52	20.59	0.07
R6	905 Stockport Road	20.00	20.02	0.02
R7	743 Stockport Road	21.06	21.12	0.06

Annual mean concentrations were below the relevant AQO at all receptor locations considered. Predicted impacts are summarised in Table A2.4.

Table A2.4 Predicted Impacts

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	IAQM Impact Descriptor
R1	334 Barlow Road	0.1	75% or Less	Negligible
R2	318 Mount Road	0.2	75% or Less	Negligible
R3	256 Broom Lane	0.2	75% or Less	Negligible
R4	78 Cromwell Grove	0.2	75% or Less	Negligible
R5	908 Stockport Road	0.2	75% or Less	Negligible
R6	905 Stockport Road	0.0	75% or Less	Negligible
R7	743 Stockport Road	0.2	75% or Less	Negligible

Impacts on annual mean PM_{10} concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be negligible at all receptor locations.

Particulate Matter ($PM_{2.5}$)

Table A2.5 Predicted Annual Mean Concentrations

Potential Impact		Predicted Annual Mean Concentration (µg/m3)		
		DM	DS	Change
R1	334 Barlow Road	8.46	8.47	0.01
R2	318 Mount Road	9.54	9.58	0.04
R3	256 Broom Lane	9.71	9.76	0.05
R4	78 Cromwell Grove	10.11	10.15	0.04
R5	908 Stockport Road	11.85	11.88	0.03
R6	905 Stockport Road	11.57	11.58	0.01
R7	743 Stockport Road	12.13	12.16	0.03

Annual mean concentrations were below the relevant AQO at all receptor locations considered. Predicted impacts are summarised in Table A2.6.

Table A2.6 Predicted Impacts

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	IAQM Impact Descriptor
R1	334 Barlow Road	0.0	75% or Less	Negligible
R2	318 Mount Road	0.2	75% or Less	Negligible
R3	256 Broom Lane	0.2	75% or Less	Negligible
R4	78 Cromwell Grove	0.2	75% or Less	Negligible
R5	908 Stockport Road	0.2	75% or Less	Negligible
R6	905 Stockport Road	0.0	75% or Less	Negligible
R7	743 Stockport Road	0.1	75% or Less	Negligible

Impacts on annual mean $PM_{2.5}$ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be negligible at all receptor locations.

It is therefore considered that the overall impacts as a result of the Proposed Development are not significant.

Further justifications are discussed in Section 5.7.

Appendix 3 IAQM Construction Phase Methodology

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the IAQM guidance. Activities are divided into four types to reflect their different potential impacts. These are:

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

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

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM_{10} and $PM_{2.5}$.

The assessment steps are detailed below.

Step 1 – Screening

Step 1 screened the requirement for a more detailed assessment. Should human receptors be identified within 250m from the site boundary or 50m from the construction vehicle route up to 250m from the site entrance, then the assessment should proceed to Step 2. Additionally, should ecological receptors be identified within 50m of the boundary site or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should also proceed to Step 2.

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

Step 2 - Assess Impacts

Step 2 assessed the risk of potential dust impacts. A site was allocated to a risk category based on two factors:

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

The two factors were combined in Step 2C to determine the risk of dust impacts without mitigation applied. Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table A3.1.

Table A3.1 Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 75,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 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 • More than 100,000 tonnes of material moved
	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	• Total building volume 12,000m^3 to 75,000m^3 • Potentially dusty construction material • Demolition activities 6m to 12m above ground level
	Earthworks	• Total site area 18,000m2 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 • Total material moved 20,000 tonnes to 100,000 tonnes
	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

Magnitude	Activity	Criteria
Small	Demolition	• Total building volume under 12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 6m above ground level • Demolition during wetter months
	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 • Total material moved less than 20,000 tonnes • Earthworks during wetter months
	Construction	• Total building volume less than 12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• <20 HDV (3.5t) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length <50m

Step 2B defined the sensitivity of the area around the development site for construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table A3.2.

Table A3.2 Examples of Factors Defining Sensitivity of an Area

Sensitivity	Receptors	
	Human	Ecological
High	• Users expect of high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10} e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of	• Nationally designated site e.g. Sites of Special Scientific Interest

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

The sensitivity of the area to dust soiling effects on people and property is shown in Table A3.3.

Table A3.3 Sensitivity to Dust Soiling Effects on People and Property

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

Table A3.4 outlines the sensitivity of the area to human health impacts.

Table A3.4 Sensitivity to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)			
			<20	Low	Low	<250
High	Greater than 32µg/m³	> 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m³	> 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28µg/m³	> 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
		> 100	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)			
			<20	Low	Low	<250
	Less than 24µg/m³	10 - 100	Low	Low	Low	Low
		1 - 10	Medium	Low	Low	Low
Medium	Greater than 32µg/m³	> 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32µg/m³	> 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24 - 28µg/m³	> 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	Less than 24µg/m³	> 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table A3.5 outlines the sensitivity of the area to ecological impacts.

Table A3.5 Sensitivity of the Area to Ecological Impacts

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

Step 2C combined the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts. Table A3.6 outlines the risk category from demolition activities.

Table A3.6 Dust Risk Category from Demolition

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

Table A3.7 outlines the risk category from earthworks and construction activities.

Table A3.7 Dust Risk Category from Earthworks and Construction

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

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

Table A3.8 outlines the risk category from trackout.

Table A3.8 Dust Risk Category from Trackout

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

Step 3 – Mitigation

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

Step 4 – Residual Impact

Once the risk of dust impacts had been determined and the appropriate mitigation measures identified, the final step was to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects using effective mitigation.

Experience shows that this is normally possible. Hence the residual effect will normally be not significant.

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