

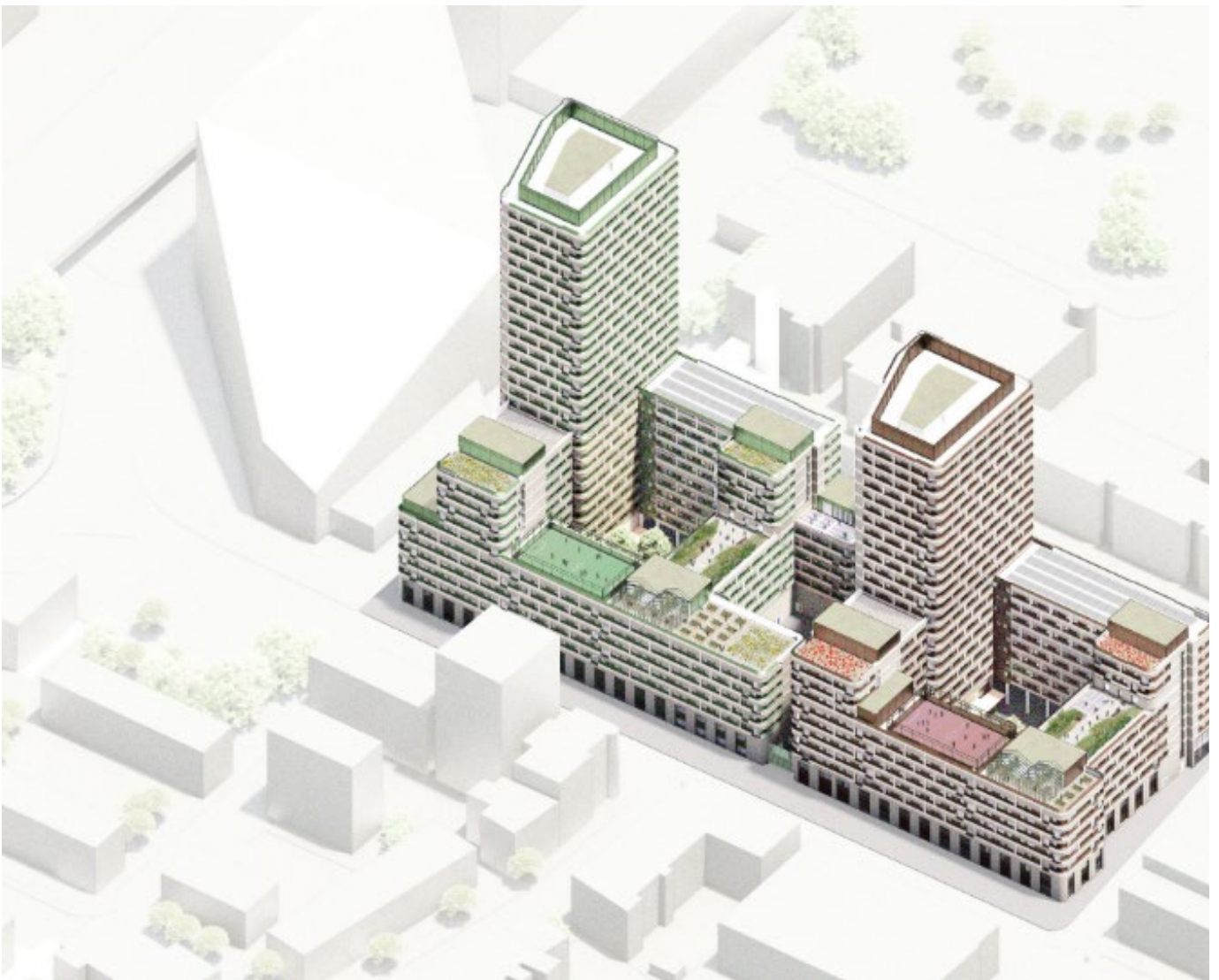
Unite Students and Manchester Metropolitan University

Cambridge Halls

Air Quality Technical Appendix 12.1

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1. Introduction

This document has been prepared by Ove Arup & Partners Ltd (Arup) to support Chapter 12: Air Quality of the ES application for full planning permission for the redevelopment of the site known as Cambridge Halls of Residence, Cavendish Street, Manchester (hereafter referred to “the Site”).

Cambridge Halls is a new UNITE student accommodation on Cavendish Street, Manchester. Demolition of existing halls of residence and erection of two buildings of 30 and 24 storeys above ground, plus basement and rooftop plant levels, comprising purpose-built student accommodation with internal and external rooftop communal amenity space (Sui Generis). Ground floor commercial and community uses (Flexible Use Classes E, F1 or F2). Hard and soft landscaping and associated highway works.

The Site comprises approximately 2,302 purpose built student accommodation units, with retail and community space at the ground floor.

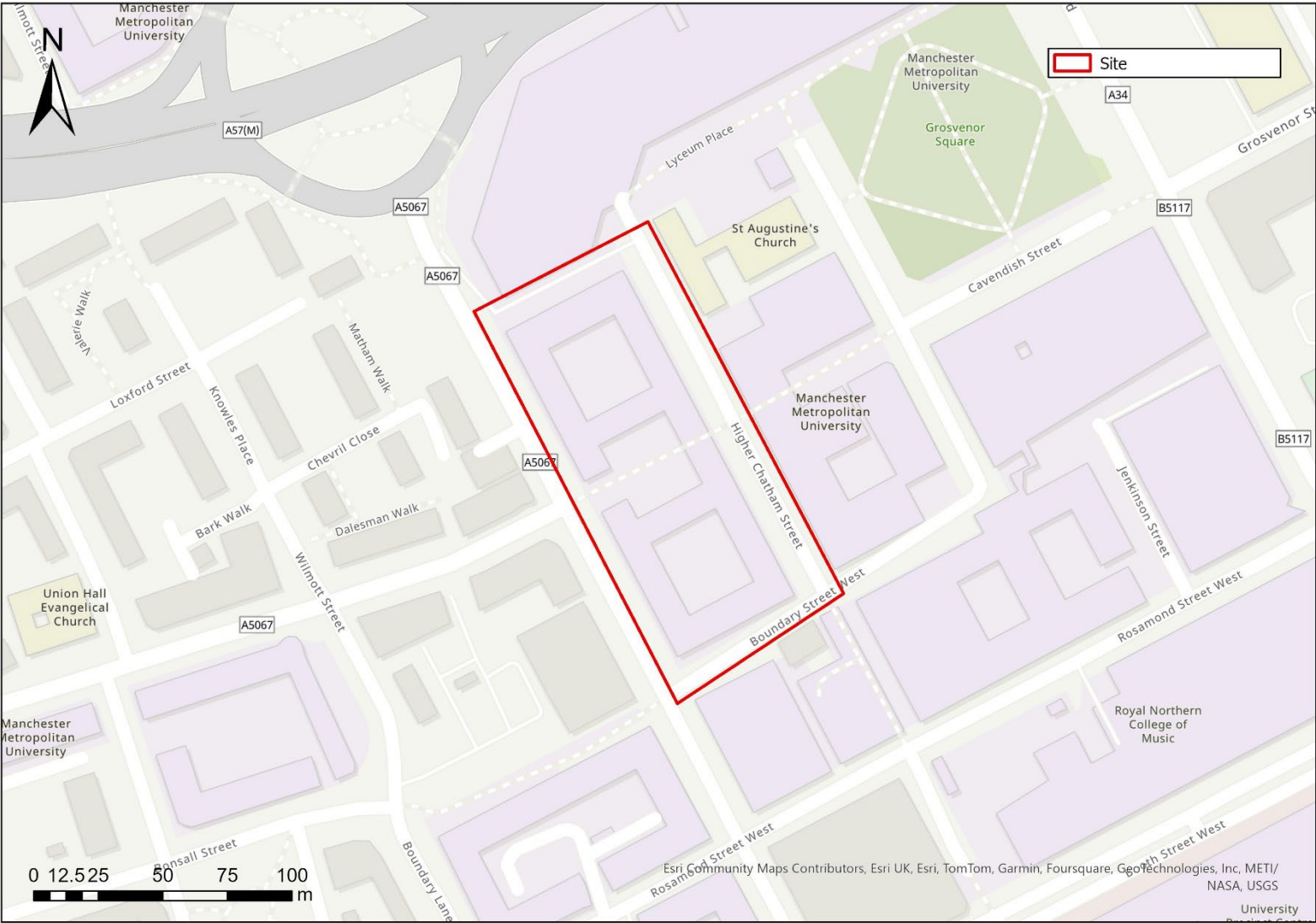
The Site is located in Greater Manchester Combined Authority (GMCA) Air Quality Management Area (AQMA). GMCA AQMA is declared due to exceedances of the annual mean standards of Nitrogen Dioxide (NO₂). The AQMA covers Manchester City Centre, the area around Manchester Airport and the main arterial traffic routes in the city which contribute to local air pollution.

The Site is located within the boundary of Manchester City Council (MCC) and is bound by Boundary Street West to the south, A5067 Higher Cambridge Street to the west, Manchester Metropolitan University’s Faculty of Business and Law to the north and the listed Righto Building adjacent to the east. The location of the Site is shown in Figure 1.

The Site will be car free and vehicle trips are expected to be limited to refuse and servicing. The air quality assessment therefore focuses on the impact of construction traffic, construction dust generation on air quality and an assessment of the existing air quality conditions in the immediate vicinity of the Site for exposure to new receptors.

This air quality assessment includes a summary of relevant air quality policy and legislation, a description of the existing air quality conditions in the vicinity of the Site, the methods used to consider and assess the potential impacts, any likely significant effects and, where necessary, recommended mitigation.

Figure 1: Site location plan



2. Air Quality Legislation

2.1 Environment Act 2021

The Environment Bill became an Act¹ (law) in November 2021. The Environment Act 2021 amends the Environment Act 1995². It also amends the Clean Air Act 1993³ to give local authorities more power at reducing local pollution, particularly that from domestic burning. It also amends the Environmental Protection Act 1990⁴ to reduce smoke from residential chimneys by extending the system of statutory nuisance to private dwellings.

The following sections of the Environment Act 1995 have been transposed into the Environment Act 2021:

- For the Secretary of State to develop, implement and maintain an Air Quality Strategy. This includes the statutory duty, also under Part IV of the Environment Act 1995, for local authorities to undergo a process of local air quality management and declare an Air Quality Management Area (AQMA) where pollutant concentrations exceed the national air quality objectives. Where an AQMA is declared, the local authority needs to produce an Air Quality Action Plan (AQAP) which outlines the strategy for improving air quality in these areas.

The Act will implement key parts of the government's Clean Air Strategy and include targets for tackling air pollution in the UK;

- for the Secretary of State to publish a report reviewing the Air Quality Strategy every five years;
- for the Office for Environmental Protection to be established to substitute the watchdog function previously exercised by the European Commission;
- for local authorities' powers to be extended under the current Local Air Quality Management framework, including responsibilities to improve local air quality and to reduce public exposure to excessive levels of air pollution;
- for "air quality partners" to have a duty to share responsibility for dealing with local air pollution among public bodies; and
- the introduction of a new power for the government to compel vehicle manufacturers to recall vehicles and non-road mobile machinery if they are found not to comply with the environmental standards that they are legally required to meet.

2.2 Environmental Improvement Plan 2023

Defra published its 25 Year Environment Plan in 2018. The Environment Act requires Defra to review this Plan at least every five years. The Environmental Improvement Plan 2023⁵ marks the first revision, outlining the progress made since 2018 and expanding on the goals defined in the original plan, including the aim of achieving clean air.

The Environmental Improvement Plan 2023 sets out the new air quality targets which have been set for concentrations of PM_{2.5} and details the role of local authorities in helping it meet both its targets and existing

¹ Environment Act 2021. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted> [Accessed January 2025]

² Environment Act 1995, Chapter 25, Part IV Air Quality

³ Clean Air Act 1993. Available at: <https://www.legislation.gov.uk/ukpga/1993/11/contents> [Accessed January 2025]

⁴ Environmental Protection Act 1990. Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> [Accessed January 2025]

⁵ Environmental Improvement Plan 2023. Available at: <https://www.gov.uk/government/publications/environmental-improvement-plan> [Accessed January 2025]

commitments. Additionally, it outlines the roles of the industry, agricultural sectors, and the Department for Transport in coordinating efforts to achieve both new and ongoing targets and commitments.

2.3 Air Quality Standards Regulations 2010 (amended in 2016) (England)

The Air Quality Standards Regulations 2010 (amended in 2016)⁶ defines the policy framework for 12 air pollutants known to have harmful effects on human health or the natural environment. The Secretary of State for the Environment has the duty of ensuring compliance with the air quality limit values.

Some pollutants have standards expressed as annual average concentrations due to the chronic way in which they affect health or the natural environment, i.e., effects occur after a prolonged period of exposure to elevated concentrations. Other pollutants have standards expressed as 24-hour or 1-hour average concentrations due to the acute way in which they affect health or the natural environment, i.e., after a relatively short period of exposure. Some pollutants have standards expressed in terms of both long and short-term concentrations. Air quality limit values and objectives are quality standards for clean air. The regulation sets out the national air quality standards for NO₂, PM₁₀ and PM_{2.5}.

For PM_{2.5}, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the limit value, originally set at 25µg/m³ and currently set at 20µg/m³.

Defra has also set two new targets, and two new interim targets, for PM_{2.5} concentrations in England. One set of targets focuses on absolute concentrations. The long-term target is to achieve an annual mean PM_{2.5} concentration of 10µg/m³ by the end of 2040, with the interim target being a value of 12µg/m³ by the start of 2028⁷. The second set of targets relate to reducing overall population exposure to PM_{2.5}. By the end of 2040, overall population exposure to PM_{2.5} should be reduced by 35% compared with 2018 levels, with the interim target being a reduction of 22% by the start of 2028.

Defra will assess compliance with the population exposure targets by averaging concentrations measured at Defra owned background monitoring stations. This will not consider small changes over time to precisely where people are exposed (such as would relate to exposure introduced by a new development). While local authorities have an important role delivering the required improvements, these are expected to relate to controlling emissions and not to directly assessing PM_{2.5} concentrations against the targets.

In March 2023, the Department for Levelling Up, Housing and Communities⁸ (DLUHC) explained that the new PM_{2.5} targets will:

“need to be integrated into the planning system, and in setting out planning guidance for local authorities and businesses, we will consider the specific characteristics of PM2.5. The guidance will be forthcoming in due course, until then we expect local authorities to continue to assess local air quality impacts in accordance with existing guidance.”

Defra has also provided advice⁹ which explains that there is no current requirement to consider the new PM_{2.5} targets in planning decisions and that guidance to local planning authorities will be forthcoming before this position changes. In the future, when planning decisions do need to consider the new targets, the expectation is that this will focus on reducing emissions from new development rather than there being a direct requirement for planning-related air quality assessments to predict PM_{2.5} concentrations.

⁶ The Air Quality Standards (Amendment) Regulations 2016, SI 2016/1184

⁷ Meaning that it will be assessed using measurements from 2027. The 2040 target will be assessed using measurements from 2040. National targets are assessed against concentrations expressed to the nearest whole number, for example a concentration of 10.4 mg/m³ would not exceed the 10µg/m³ target.

⁸ DLUHC (2023) Planning Newsletter, Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1140170/03_Chief_Planners_Newsletter_March_2023.pdf

⁹ Defra (2023) Integrating the Environment Act air quality targets into the planning system, Proc. IAQM Routes to Clean Air conf. Manchester, 10th October 2023.

Therefore, for the time being, no robust assessment is possible in relation to the new PM_{2.5} targets. However, in absence of forthcoming guidance, the updated PM_{2.5} targets have been used in this assessment.

In this assessment, the term ‘Air Quality Standard’ (AQS)⁶ has been used to refer to the national limit values. Table 1 below sets out the national air quality standards for NO₂, PM₁₀ and PM_{2.5}, the main pollutants of concern in the UK and the local area.

Table 1: Air quality standards

Pollutant	Averaging Period	Limit value / objective
Nitrogen dioxide (NO ₂)	Annual mean	40µg/m ³
	1-hour mean	200µg/m ³ not to be exceeded more than 18 times a year (99.79 th percentile)
Particulate matter (PM ₁₀)	Annual mean	40µg/m ³
	24-hour mean	50µg/m ³ not to be exceeded more than 35 times a year (90.41 st percentile)
Fine particulate matter (PM _{2.5})	Annual mean	20µg/m ³
		12µg/m ³ to be achieved by 2028
		10µg/m ³ to be achieved by 2040*
Note: * The Environmental Targets (Fine Particular Matter) (England) Regulations 2023 updated in 2023, to state that the “the annual mean level of PM _{2.5} in ambient air must be equal to or less than 10 µg/m ³ (“the target level”)” by 31st December 2040 ¹⁰ . The Environmental Improvement Plan (2023) sets an interim target of 12 µg/m ³ , to be achieved by 31 January 2028.		

2.4 Non-Road Mobile Machinery Regulations

The Non-Road Mobile Machinery (NRMM) (Emission of Gaseous and Particulate Pollutants) (Amended) Regulations 2014 (SI 2014/1309), which implement EU Directive 2012/46/EU, has been superseded by the Environment Act 2021¹. However, the Regulations 2014 (SI 2014/1309) and EU directives highlight important considerations in that the regulations require that NRMM engines meet certain emissions standards for different engine types. It also aims to reduce emissions from NRMM through the fitting of devices to engines, to help meet the Stage IV emissions standard, where applicable.

2.5 Dust Nuisance

Dust is the generic term used in the British Standard document BS 6069 (Part Two) to describe particulate matter in the size range 1–75µm in diameter. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the Environmental Protection Act 1990¹¹, dust nuisance is defined as a statutory nuisance.

There are currently no standards or guidelines for dust nuisance in the UK, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology and the highly subjective relationship between deposition events, surface soiling and the perception of such events as a nuisance. In law, complaints about excessive dust deposition would have to be investigated by the local authority and any complaint upheld for a statutory nuisance to occur. However, dust deposition is generally managed by suitable on-site practices and mitigation rather than by the determination of statutory nuisance and/or prosecution or enforcement notice(s).

¹⁰ Defra, 2023. Chief Planners Newsletter. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1140170/03_Chief_Planners_Newsletter_March_2023.pdf [Accessed January 2025]

¹¹ Environmental Protection Act 1990, Chapter 43, Part III Statutory Nuisances and Clean Air

3. Policy and Guidance

3.1 National Policy and Guidance

3.1.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was updated in December 2024 with the purpose of planning to achieve sustainable development. Paragraph 199 of the NPPF on air quality states that:

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

In addition, paragraph 110 states that:

“The planning system should actively manage patterns of growth in support of these objectives. 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. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.”

Paragraph 187 discusses how planning policies and decisions should contribute to and enhance the natural and local environment. In relation to air quality, NPPF notes that this can be achieved 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.”

3.1.2 Planning Practice Guidance

National Planning Practice guidance (NPPG) on various topics, including air quality was developed in order to support the NPPF. The guidance¹³ provides a concise outline as to how air quality should be considered in order to comply with the NPPF and states when air quality is considered relevant to a planning application. This includes factors such as changes in traffic volumes, vehicle speeds, congestion or traffic composition, the introduction of new point sources of air pollution, exposure of people to existing sources of air pollutants, and the potential to give rise to air quality impacts at nearby sensitive receptors.

3.1.3 Clean Air Strategy

The Department for Environment, Food and Rural Affairs' (Defra) Clean Air Strategy¹⁴ was published in 2019 and sets targets for improving air quality across the country. It includes actions for reducing emissions from various sources, such as transport, domestic activities, farming and industry. There is also a long-term

¹² Ministry of Housing, Communities and Local Government (2024) National Planning Policy Framework

¹³ Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2019) Air quality

¹⁴ Defra (2019) Clean Air Strategy 2019

target for reducing population exposure to PM_{2.5} concentrations to meet the World Health Organisation's (WHO) target of 10µg/m³ as an annual mean. In particular, the Clean Air Strategy states:

“New legislation will create a stronger and a more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanism.”

3.1.4 Local Air Quality Management Policy and Technical guidance

The policy guidance note, LAQM.PG(22)¹⁵ is for local authorities in England. It provides local authority-led action to improve local air quality using available levers, including planning, public health and transport responsibilities. This guidance is also relevant to Mayoral Combined Authorities¹⁶, and external organisations who may need to engage with the local authority to assist in the delivery of their statutory duties on managing air quality. There are several updates detailed in the LAQM.PG (22), as follows:

- Local AQAP are required to demonstrate that local air quality objectives are met and achieved;
- An Air Quality Management Area is required to be declared within 12 months of identifying an exceedance of the air quality objectives;
- Local authorities are required to produce an AQAP within 18 months of declaring an AQMA; and
- The introduction of a system of reminder and warning letters to increase transparency and accountability on local air quality.

The technical guidance, LAQM.TG(22)¹⁷ is designed to support local authorities across the UK in carrying out their duties to review and assess and take action to improve air quality under the Environment Act 1995² as amended by the Environment Act 2021¹. It provides detailed guidance on how to assess the impact of measures using existing air quality tools. Where relevant, this guidance has been taken into account in this air quality assessment.

3.2 Local Planning Policy and Guidance

3.2.1 Greater Manchester Air Quality Action Plan 2016-2021

The Greater Manchester Air Quality Action Plan¹⁸ primary objective is to improve air quality across Greater Manchester by 2025. Within the Plan, both priority areas such as specific locations within the city have been identified to focus efforts, as well as Key Performance Indicators. These include; reducing traffic increase efficiency, and improve fleet.

Section 5.1 (Table 3) within the Action Plan provides further detail on the Key Performance Indicators

- *“Reduce Traffic - Reduce the number of vehicle movements, either during peak hours or more generally. This may affect the whole fleet or only part of it. E.g. reduce the number of private cars by redistribution onto public transport*

¹⁵ Defra (2022) LAQM.PG(22)

¹⁶ A legal body set up using national legislation that enables a group of two or more councils to collaborate and take /collective decisions across council boundaries.

¹⁷ Defra (2022) LAQM.TG(22)

¹⁸ Greater Manchester Air Quality Action Plan (2016 – 2021). Available at: file:///C:/Users/Georgia.Puleikis/Downloads/GM_Air_Quality_Action_Plan_2016_21_1_.pdf [Accessed January 2025]

- *Increase Efficiency - Improve the traffic flow to reduce congestion and achieve lower emissions from the existing fleet. E.g. changing speeds to achieve less stop-start movement or more efficient driving profiles, such as through variable speed limits, traffic light timing or driver education.*
- *Improve Fleet - Change the composition of the existing fleet to increase the proportion of low-emission vehicles. E.g. displace older vehicles in favour of newer vehicles that achieve a high Euro engine emission standard or have ultra-low-emissions, such as Electric Vehicles (EVs)."*

3.2.2 Greater Manchester Clean Air Plan

Greater Manchester's Clean Air Plan¹⁹ is currently under review by the Government.

The updated plan would see investment in cleaner buses, taxis and measures to manage traffic and under the Clean Air Plan proposals Manchester would meet legal limits for NO₂ by 2026. The updated proposals include investment through:

- 40 new zero-emission electric buses, EV charging infrastructure at bus depots, and upgrading 77 buses to be Euro VI.
- Clean Air Taxi Fund to provide financial support to upgrade to a cleaner vehicle.
- Investment in local traffic measures to manage traffic flow, to bring NO₂ within legal limits on Regent Road and Quay Street.

3.2.3 Manchester City Council Air Quality & Planning Technical Guidance

The Manchester City Council Air Quality & Planning Technical Guidance²⁰ is focused on reducing air pollution from road transport, and seeks to support the planning system in lowering transport emissions and improving local air quality.

The guidance breaks down measures to adopt best practice guidance regarding the assessment and mitigation of emissions from demolition and construction sites and development planning.

Section 3.1 Construction & Demolition;

"Harmful emissions contributing to decreased air quality in our local areas are produced during the demolition and construction phases of development. The main air quality impacts arising from these activities are:

1. *Dust deposition resulting in the soiling of surfaces;*
2. *Visible dust plumes, which are evidence of dust emissions;*
3. *Elevated PM10 concentrations as a result of dust generating activities on site;*
4. *The transport of dust and dirt from the construction/demolition site onto the public road network, where it can be re-suspended by vehicles using the roads; and*
5. *An increase in concentrations of airborne particles and NO₂ due to exhaust emissions from diesel powered vehicles and equipment used on site (Non-Road Mobile Machinery - NRMM) and vehicles accessing the site."*

Section 3.2 Development Planning

"In applying for planning permissions, developers will need to consider any air quality impacts the operational phase of the development may create, including the cumulative impacts of other committed developments. Impacts may include pollutant emissions from additional vehicle movements generated by the

¹⁹ Greater Manchester Clean Air Plan Available at: <https://cleanairm.com/clean-air-plan/> [Accessed January 2025]

²⁰ Manchester City Council Air Quality & Planning Technical Guidance. Available at: https://www.manchester.gov.uk/downloads/download/5199/environmental_and_public_protection_information_for_developers. [Accessed January 2025]

proposed development, substantial combustion processes, or from gas-fired boilers, CHP plant and solid biomass boilers. The following issues should be considered:

- *Compliance with air quality target values, long-term objectives and relevant limit values for concentrations of key air pollutants;*
- *Whether the development will materially affect any air quality action plan or strategy;*
- *Overall changes in air quality as a result of a proposed development; and*
- *Whether the development will introduce new relevant exposure into an area of existing poor air quality.”*

3.3 Other Relevant Policy and Guidance

3.3.1 Institute of Air Quality Management Dust Guidance

The Institute of Air Quality Management (IAQM) guidance²¹ provides guidance to development consultants and environmental health officers on how to assess air quality impacts from construction. The IAQM guidance provides a method for classifying the significance of effect from construction activities based on the ‘dust magnitude’ (high, medium or low) and proximity of the Site to the closest receptors. The guidance recommends that once the significance of effect from construction is identified, the appropriate mitigation measures are implemented. Experience has shown that once the appropriate mitigation measures are applied, in most cases the resulting dust impacts can be reduced to negligible levels.

3.3.2 Guidance on Land-use Planning and Development Control

The 2017 Land-Use Planning & Development Control guidance document²² produced by Environmental Protection UK (EPUK) and the IAQM provides a framework for professionals operating within the planning system to provide a means of reaching sound decisions, with regard to the air quality implications of development proposals.

The document provides guidance on when air quality assessments are required by providing screening criteria regarding the size of a development, changes to traffic flows/composition, energy facilities or combustion processes associated with the development.

²¹ IAQM (2024) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2)

²² IAQM & EPUK (2017) Land-Use Planning & Development Control: Planning for Air Quality

4. Scope and Consultation

4.1 Scope of Assessment

This air quality assessment comprises:

- Consultation with the Environmental Health Officer (EHO) at MCC;
- A baseline assessment to determine existing air quality conditions in the area around the Site;
- A review of traffic data provided by the project team;
- A review of the proposed onsite combustion sources provided by the project team;
- An assessment of potential changes in air quality arising from the construction and operation of the Site; and
- A review of mitigation measures and monitoring requirements for the construction of the Site.

4.2 Consultation with MCC

To inform the EIA process, a Scoping Opinion has been requested from MCC informed by the Scoping Report. The Scoping report includes detail on Air Quality, including the proposed scope and assessment methodology.

5. Methodology

5.1 Methodology of Baseline Assessment

Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

A desk-based review of the following data sources has been undertaken to determine the baseline air quality conditions in this assessment:

- Manchester City Council's Air Quality ASR for 2023²³;
- Clean Air Greater Manchester²⁴;
- Department for Environment, Food & Rural Affairs (Defra)'s Local Air Quality Management website The Environment Agency website²⁵; and
- The UK Air Information Resource website²⁶.

5.2 Methodology of Construction Assessment

5.2.1 Construction Dust Assessment

The effects from demolition and construction of the Site have been assessed using the qualitative approach described in the latest guidance by the IAQM. The guidance considers the potential for dust emissions arising from activities such as demolition, earthworks, construction and trackout, and the effects these may have on human health, dust soiling and ecological harm. Further information for the approach is presented in Appendix A.

5.2.2 Construction Traffic Assessment

A screening assessment has been undertaken using the indicative criteria in the EPUK/IAQM land-use guidance²². As the Site is located within GCMA AQMA, the following criteria apply:

- A change of Light Duty Vehicle (LDV) flows of more than 100 annual average daily traffic (AADT) movements; or
- A change of Heavy Duty Vehicle (HDV) flows of more than 25 AADT movements.

Meeting any of the criteria would indicate that detailed dispersion modelling of road traffic emissions would be necessary.

Construction traffic data was obtained from the project transport consultants. The construction proposed development trips are as follows:

- Daily average of 18 HGVs will attend site with approximately 36 journeys per day.
- At peak a maximum of 25 HGVs will attend site with approximately 50 journeys per day.

Given the two-way movements exceed the IAQM criteria, a detailed air quality assessment was undertaken.

The air quality effects of emissions from traffic generated by the Proposed Development have been assessed using the Atmospheric Dispersion Modelling System, ADMS-Roads atmospheric dispersion model. The

²³ Greater Manchester Air Quality Annual Status Reports. Available at: <https://cleanairgm.com/monitoring-reports/> [Accessed: January 2025]

²⁴ Clean Air Greater Manchester. Available online at: <https://cleanairgm.com/> [Accessed: January 2025]

²⁵ Environment Agency website; <https://environment.data.gov.uk/public-register/view/search-industrial-installations> [Accessed January 2025]

²⁶ Defra, <http://uk-air.defra.gov.uk> [Accessed January 2025]

assessment follows the methodology set out in Defra's LAQM Technical Guidance¹⁷, and the inputs and processes used are detailed in the following sections.

5.2.2.1 Traffic Data

Traffic data were obtained from the project transport consultant for the major roads surrounding the Site.

The assessment scenarios are summarised as follows:

- 2023 current baseline scenario;
- 2026 'Do Nothing' future baseline scenario; and
- 2026peak construction scenario.

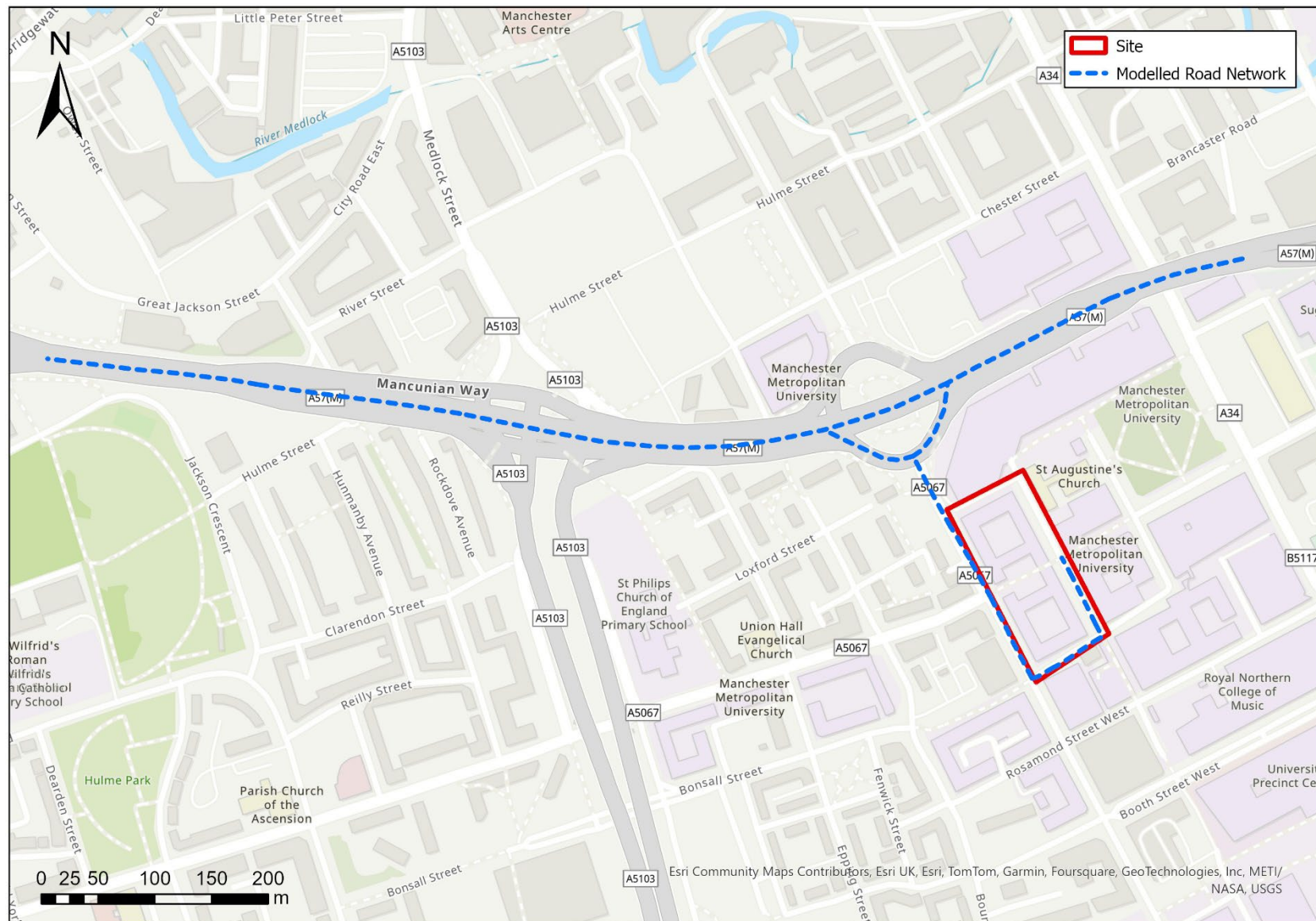
The 2023 baseline scenario represents the existing baseline conditions, based on the most recent available monitoring data. The 2026 'Do Nothing' scenario represents the future baseline conditions for which the 2026 peak construction traffic of the site can be assessed.

The modelled road network is shown in Figure 2, with Appendix B providing the details of the modelled roads used in the assessment.

Emission rates for all road sources were calculated using Defra's Emissions Factor Toolkit (EFT) v12.1²⁷. 2023 emissions rates have been used in the 2023 baseline scenario and 2026 emission rates have been used in the future assessment scenarios.

²⁷ Defra, Emission Factor Toolkit v12.1. Available at: <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/>
[Accessed: January 2025]

Figure 2: Modelled construction traffic road network



5.2.2.2 Selection of background concentrations

Defra background concentrations²⁶ have been used in the assessment and the years used are in line with the modelling scenarios. Further information can be found in Section 6.

5.2.2.3 Sensitive Receptors

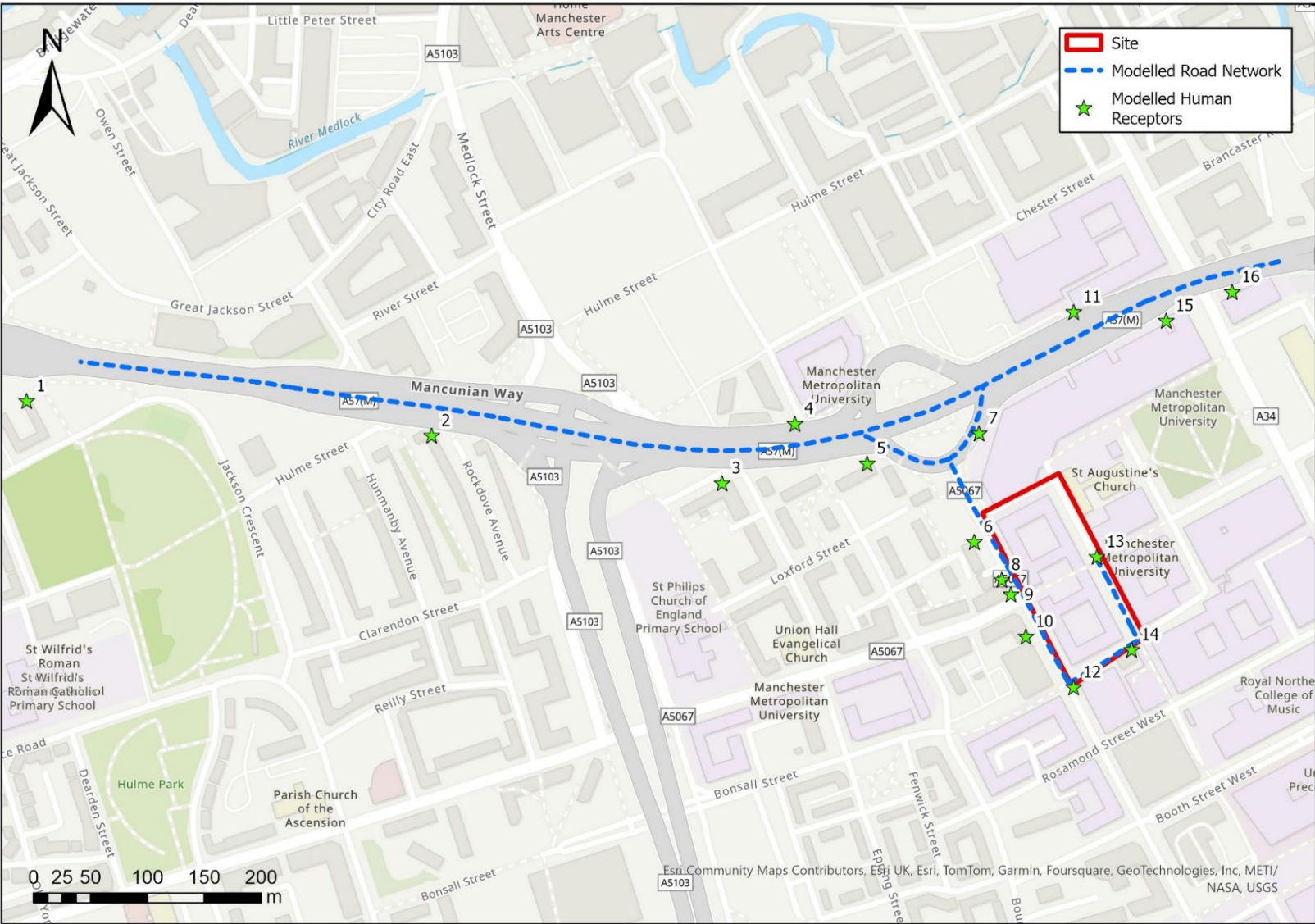
Pollutant concentrations have been predicted at existing receptors. Receptor locations closest to the roads and junctions included in the modelling have been selected to provide a representative assessment of potential worst-case exposure. Only the receptors located close to the modelled road network have been reported, representing worst case locations.

Details of the assessed receptors are given in Table 2 and their locations are shown in Figure 3. The receptors were modelled at a height of 1.5m (corresponding to human exposure at ground level).

Table 2: Existing receptors included in the assessment

ID	Receptor	National Grid Reference		Height (m)
		X	Y	
1	Residential	383247	397126	1.5
2	Residential	383603	397096	1.5
3	Residential	383858	397054	1.5
4	New Medlock House Student Halls	383922	397106	1.5
5	Residential	383986	397071	1.5
6	Cambridge House Student Halls	384080	397002	1.5
7	Faculty of Business and Law	384084	397098	1.5
8	Element Manchester Student Halls	384104	396969	1.5
9	Manchester House Student Halls	384112	396956	1.5
10	Opal Hall Student Halls	384125	396919	1.5
11	Faculty of Science and Engineering	384167	397204	1.5
12	Student Union	384167	396875	1.5
13	Cavendish Student Halls	384188	396989	1.5
14	School of Digital Arts	384218	396908	1.5
15	Manchester Law Building	384248	397197	1.5
16	Institute of Sport Building	384307	397222	1.5

Figure 3: Human receptors included in the assessment



5.2.2.4 Dispersion Model

Detailed dispersion modelling of NO_x, PM₁₀ and PM_{2.5} emissions was undertaken using the ADMS-Roads (version 5.0.0.1) atmospheric dispersion model from Cambridge Environmental Research Consultants (CERC).

The ADMS suite of models has been widely validated for road sources. It is regularly tested against other dispersion models by the Environment Agency's (EA) Air Quality Modelling and Assessment Unit (AQMAU) and is suitable for air quality assessment. The model incorporates the latest understanding of boundary layer meteorology and dispersion.

5.2.2.5 Meteorological Data

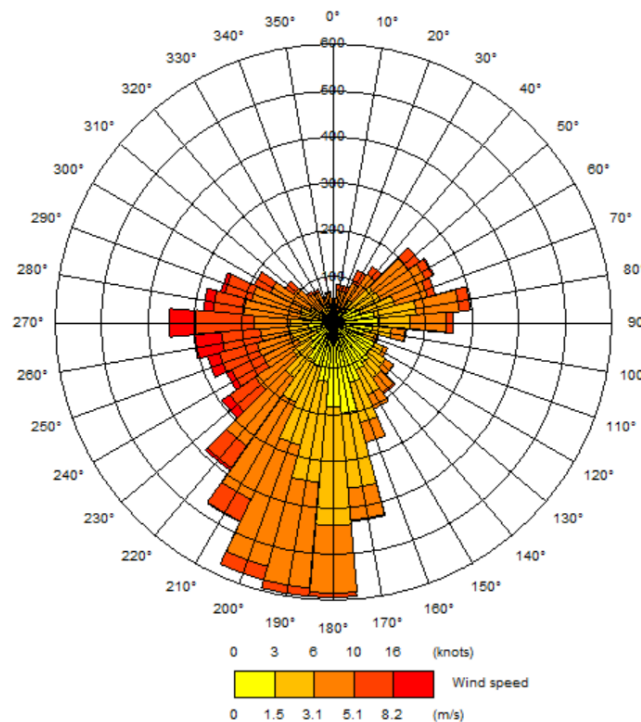
In order for the modelling exercise to be representative of local conditions and to predict long-term averages, the dispersion model requires representative meteorological data. Meteorological data used in this assessment was measured at Manchester Airport meteorological station for 2023. Manchester Airport is located approximately 12.5km to the south of the Proposed Development, and due to its location is considered to be the most representative meteorological station.

Figure 4 shows the data as a wind rose for 2023. The predominant wind direction is south.

Most dispersion models for roads do not use meteorological data if they relate to calm winds conditions, as dispersion in calm conditions is difficult to calculate in Gaussian or advanced Gaussian models. ADMS-Roads treats calm wind conditions by setting the minimum wind speed to 0.75m/s. Defra's LAQM.TG22¹⁷ guidance recommends that the meteorological data file is tested within a dispersion model and the relevant output log file checked to confirm the number of missing hours and calm hours that cannot be used by the dispersion model. This is important when considering predictions of high percentiles and the number of exceedances. The guidance recommends that meteorological data should only be used if the percentage of usable hours is greater than 75% and preferably 90%.

The dataset used includes 8,734 lines of usable hourly data (about 99% of the hours in a year), well above the 90% threshold; therefore, the data meets the requirements of the Defra guidance and is appropriate for use in the dispersion modelling.

Figure 4: Wind rose for Manchester airport (2023)



5.2.2.6 Other Model Parameters

The extent of mechanical turbulence (and hence, mixing) in the atmosphere is affected by the roughness of the surface/ground over which the air is passing. Typical surface roughness values range from 1.5m (for cities, forests and industrial areas) to 0.0001m (for water or sandy deserts).

The area around the Site can be best described as ‘large urban areas’ with a corresponding surface roughness of 1.5m.

The minimum Monin-Obukhov length is a model parameter which describes the extent to which the urban heat island effect limits stable atmospheric conditions. For this model, a length of 30m was used corresponding to “cities and large towns”, to represent the Site.

5.2.2.7 Model Verification

Model verification refers to the comparison of modelled and measured pollutant concentrations at the same points to determine the performance of the model. Should the model results for NO₂ be mostly within $\pm 25\%$ of the measured values and there is no systematic over or under-prediction of concentrations, then the Defra’s LAQM.TG22¹⁷ guidance advises that no adjustment is necessary. If this is not the case, modelled concentrations are adjusted based on the observed relationship between modelled and measured NO₂ concentrations to provide a better agreement.

The model verification process was completed using the results of the 2023 baseline scenario. An adjustment factor of 3.3 was obtained during the verification process, which indicated that the model was under-predicting NO₂ concentrations. The verification factor was used to adjust the modelled NO_x concentrations. Further details of the verification factor calculations are presented in Appendix B.

5.2.2.8 Results Processing

NO_x to NO₂ Conversion

The model predicts NO_x concentrations which comprise nitric oxide (NO) and NO₂. NO_x is emitted from combustion processes, i.e. combustion plant and vehicles, primarily as NO with a small percentage (usually less than 5%) of NO₂. The emitted NO reacts with oxidants in the air (mainly ozone) to form NO₂ and this oxidation occurs at a rate determined by a variety of factors including the concentration of oxidants in the air, wind speed and temperature. The concentration of NO₂ at any one point in the plume will depend on these factors as well as the time since the pollutants were emitted.

NO₂ is associated with effects on human health and therefore the air quality standards for the protection of human health are based on NO₂ rather than total NO_x or NO. A suitable NO_x to NO₂ conversion has been derived and applied to the modelled NO_x concentrations, in order to determine the impact of the NO_x emissions on ambient concentrations of NO₂.

Defra LAQM.TG22¹⁷ guidance details an approach for calculating the roadside conversion of NO_x to NO₂, which takes into account the difference between ambient NO_x concentrations with and without the Proposed Development, the concentration of ozone and the different proportions of primary NO₂ emissions in different years. This approach is available as a spreadsheet calculator, with the most up to date version having been released in 2020 (v9.1)²⁸.

1-hour mean NO₂

Research carried out on behalf of Defra identified that exceedances of the NO₂ hourly objective are unlikely to occur where the annual mean concentration is below 60µg/m³. This assumption is referred to in the Defra LAQM.TG22¹⁷ guidance and has been used to assess the risk of an exceedance of the short-term objective.

²⁸ Defra, 2020. NO_x to NO₂ calculator. <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/>

Predicted PM₁₀ and PM_{2.5} concentrations

The total annual PM₁₀ and PM_{2.5} concentrations at each receptor are the sum of Defra background concentrations and the road traffic contribution.

Once processed, the predicted concentrations were compared against the relevant air quality objectives set out in Appendix B.

5.2.2.9 Impact Descriptors and Significance Criteria

The 2017 EPUK/IAQM 'Land-Use Planning & Development Control'²² guidance provides an approach to determining the air quality impacts resulting from a Proposed Development and the overall significance of local air quality effects arising from a Proposed Development.

Firstly, impact descriptors are determined based on the magnitude of incremental change as a proportion of the relevant assessment level, in this instance the annual mean objectives. The change is then examined in relation to the predicted total pollutant concentrations in the assessment year and its relationship with the annual mean objectives.

The assessment framework for determining impact descriptors at each of the assessed receptors is shown in Table 3. These annual mean descriptors are only relevant for receptor locations where the public could be expected to reside for a year (i.e. residential receptors).

Table 3: Impact descriptors

Annual Average Concentrations at Receptor in the Assessment Year	% Change in Concentrations Relative to Annual Mean Objectives			
	1	2-5	6-10	>10
75% or less of objective	Negligible	Negligible	Slight	Moderate
76-94% of objective	Negligible	Slight	Moderate	Moderate
95-102% of objective	Slight	Moderate	Moderate	Substantial
103-109% of objective	Moderate	Moderate	Substantial	Substantial
110% or more of objective	Moderate	Substantial	Substantial	Substantial
Note: Changes in pollutant concentrations of 0% i.e. <0.5% would be described as negligible				

The impact descriptors at each of the assessed receptors can be used as a starting point for making judgements on the effect of the Proposed Development. However, other considerations need to be accounted for, such 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.

Professional judgement should be used to determine the overall effect of the Proposed Development, however in circumstances where the Proposed Development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

5.3 Methodology of Operational Assessment

5.3.1 Onsite Combustion Plant Emissions

It is understood that the Site will run on a communal Air Source Heat Pump (ASHP) and photovoltaic panels for renewable energy generation, with no combustion sources expected on Site. There will be one life safety generator unit onsite for the secondary supplies to firefighting lifts and smoke extract fans and diesel pumps for a wet risers and commercial sprinklers.

From the information provided by the project team in relation to the life safety generator, there will be routine testing and maintenance for one hour a month. The total operational hours are expected to be less than 18 hours per year. It is therefore unlikely to exceed the hourly mean NO₂ objective (200µg/m³ not to be exceeded more than 18 times a year), and further assessment is not required.

As informed by the design team, the generator flue will exhaust at high level on the ground floor to the external street level, located at least 3 metres from air inlets and openable windows.. It is recommended that the flue position is confirmed prior to commencement of works.

5.3.2 Operational Traffic Assessment

A screening assessment has been undertaken using the indicative criteria in the EPUK/IAQM land-use guidance²², and the criteria are presented in section 5.2.2 above.

Operational trip data was obtained from the project transport consultants for the Site. The development is car-free, with the provision of up to 10 disabled parking spaces, and is predicted to generate 40 LDV trips (arrivals) a day. Compared with the existing site, there would be a net increase of 14 LGVs and 0 HGV trips, this equates to an LDV AADT of 28.

Based on the minimal traffic numbers, an operational traffic assessment has been scoped out of requiring further detailed assessment as effects would be negligible.

6. Baseline Assessment

6.1 Sources of Air Pollution

6.1.1 Industrial Processes

Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A(1), A(2), Part B or Medium Combustion Plant (MCP) processes, and are regulated through the Pollution Prevention and Control (PPC) system^{29, 30}. The larger more polluting processes are regulated by the EA, and the smaller less polluting ones by the local authorities. Local authorities regulate only for emissions to air, whereas the EA regulates emissions to air, water and land.

According to the EA website²⁵, there are two regulated industrial installation within 1km of the Site. There are further three regulated industrial installations within 3km of the Site, all detailed in Table 4. The contribution of all industrial processes to local air quality are assumed to be included in the Defra background pollutant concentrations.

Table 4: Industrial sources within 3km of the Site.

Site ID	Permit Number	Site postcode	OS coordinates (X, Y)	Type of Industry	Distance from site (km)
EQUINIX (UK) LIMITED	EPR/WE9618AA	M15 6SE	384400, 396410	Medium Combustion Plant	0.6
MANCHESTER HEAT NETWORK TRADECO LIMITED	EPR/JP3700BU	M2 3WS	383710, 397670	Medium Combustion Plant	0.8
HEINEKEN UK LIMITED	EPR/BV7796IW	M15 6LD	383900, 395900	Animal and vegetable treating for food	1.2
NSI INDUSTRIAL O&M SOLUTIONS LTD	EPR/CP3531GM	M15 6LD	383900, 395900	Disposal of non-hazardous waste involving biological treatment	1.2
Vodafone Limited	EPR/JP3824SH	M1 2NP	385370, 398008	Medium Combustion Plant	1.5

6.1.2 Road Traffic

In recent decades, atmospheric emissions from transport on a national basis have grown to match or exceed other sources in respect of many pollutants, particularly in urban areas. The local air quality of the Site is mainly influenced by vehicle emissions, from the A57 north of the Site, and the A5067 Cambridge Street to the west of the Site.

²⁹ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

³⁰ The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390

6.2 Local Air Quality

The Environment Act 2021³¹ requires local authorities to review and assess air quality with respect to the objectives for the pollutants specified in the National Air Quality Strategy. Where objectives are not predicted to be met, local authorities must declare the area as an AQMA. In addition, local authorities are required to produce an AQAP which includes measures to improve air quality within the AQMA.

Manchester City Council have one AQMA³¹, declared for exceeding the NO₂ annual mean air quality standard. The Site is located within GCMA AQMA.

6.3 Local Monitoring

MCC undertakes both continuous and passive monitoring of air quality. A review of existing air quality conditions in the area surrounding the Site has been undertaken using the 2023 MCC ASR²³.

There is one automatic monitor for NO₂ and PM₁₀ and 52 diffusion tube sites for NO₂ within 1 km of the Site. There is no PM_{2.5} monitoring within 1 km of the Site. Details and monitoring data for the past five years (2019 to 2023) are outlined in the following paragraphs. Locations of the monitoring sites are shown in Figure 5.

It should be noted that monitoring data from 2020 and 2021 is not considered to be representative of typical conditions due to impacts from the Covid-19 pandemic, however this data is included in the baseline for completeness.

6.3.1 Automatic Monitoring

Automatic or continuous monitoring involves drawing air through an analyser continuously to obtain near real-time pollutant concentration data.

MCC operates one automatic monitoring station within 1km of the Site, details of the automatic monitoring at this location are included in Table 5.

Table 5: Details of automatic monitoring sites within 1km of the Site.

Site ID	Site Name	Site Type	OS coordinates (m)		Pollutants Monitored at the Automatic Urban Monitoring Network
			X	Y	
MAN1	Manchester Oxford Road	Kerbside	384233	397287	NO ₂ , PM ₁₀

Table 6 shows the monitoring results for NO₂ from 2019 to 2023 at MAN1. The maximum mean NO₂ concentration over this period was 59µg/m³ recorded in 2019. There are four recorded exceedances of the annual mean or hourly mean NO₂ air quality standards between 2019 and 2023.

Table 6: Automatic monitoring results for annual mean NO₂ from 2019 to 2023

Site ID	Site Name	Annual Mean NO ₂ Concentration (µg/m ³)				
		2019	2020	2021	2022	2023
MAN1	Manchester Oxford Road	59	36	44	43	41
Notes: Results in bold denote exceedances of the air quality objective (40µg/m ³).						

Table 7 shows the monitoring results for PM₁₀ from 2019 to 2023 at MAN1. The maximum mean PM₁₀ concentration over this period was 26µg/m³ recorded in 2019. The PM₁₀ 24-hourly mean standard (exceeding 50µg/m³ more than 35 times a year) was not exceeded.

³¹ Greater Manchester Combined Authority ASR 2023:

https://downloads.ctfassets.net/tlpgbvylk6h2/3XAEIZRea7W64L3A61H8R7/7a092aac00f18413a78ac611418526fe/ASR_2024_reporting_on_2023_Air_Quality_Final.pdf

Table 7: Automatic monitoring results for annual mean PM₁₀ from 2019 to 2023

Site ID	Site Name	Annual Mean PM ₁₀ Concentration (µg/m ³)					PM ₁₀ 24-hour mean exceedances				
		2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
MAN1	Manchester Oxford Road	26	18	18	18	18	18	5	2	8	4

6.3.2 Diffusion Tube Monitoring

MCC operates a network of passive diffusion tubes and Manchester Clean Air Plan (CAP) diffusion tube monitoring. There are 52 diffusion tubes (one of which is co-located) located within 1km of the Site, measuring NO₂ concentrations on a monthly basis. All 52 diffusion tubes are located within GCMA AQMA. The details of the monitoring locations are included in Table 8. Table 9 shows the monitoring results for NO₂ from 2019 to 2023, which are the most recent years of available monitoring data.

In 2023, there were recorded exceedances of the NO₂ annual mean objective of 40µg/m³ at 16 monitoring locations. With regards to the short-term NO₂ standard as defined in the LAQM.TG(22) guidance¹⁷, there were two recorded annual mean NO₂ concentrations above 60µg/m³ in the last five years, both recorded at site 045 adjacent to the A57, 740m west of the Site.

The situation at the Site is similar to that of roadside diffusion tubes 12 and 122, at these monitoring sites, annual average NO₂ concentrations in 2023 were 37.3µg/m³ and 37.9µg/m³ respectively, below the NO₂ annual mean objective (40µg/m³). At the Site, as NO₂ concentrations are below 60µg/m³, exceedances of the hourly mean NO₂ objective are unlikely.

Table 8: Details of diffusion tube monitoring locations within 1km of the Site

Site ID	Site Name	Site Type	OS Coordinates (m)	
			X	Y
002	CAP_MANC_002	Roadside	384890	397410
003	CAP_MANC_003	Roadside	385124	397234
004	CAP_MANC_004	Roadside	384847	397416
006	CAP_MANC_006	Roadside	384773	397492
019	CAP_MANC_019	Roadside	384235	397286
020	CAP_MANC_020	Roadside	384789	397314
021	CAP_MANC_021	Roadside	384734	397268
022	CAP_MANC_022	Roadside	384816	397449
041	CAP_MANC_041	Roadside	383371	397136
042	CAP_MANC_042	Roadside	383637	397097
043	CAP_MANC_043	Roadside	383855	397070
044	CAP_MANC_044	Roadside	383273	397147
045	CAP_MANC_045	Roadside	383357	397167
073	CAP_MANC_073	Roadside	383739	397616
074	CAP_MANC_074	Roadside	383509	397687
075	CAP_MANC_075	Roadside	383389	397716
091	CAP_MANC_091	Roadside	384563	397935
104	CAP_MANC_104	Roadside	384676	397854
105	CAP_MANC_105	Roadside	384632	397836
106	CAP_MANC_106	Roadside	384646	397856

Site ID	Site Name	Site Type	OS Coordinates (m)	
			X	Y
107	CAP_MANC_107	Roadside	384214	398052
120	CAP_MANC_120	Roadside	384441	396934
121	CAP_MANC_121	Roadside	384400	396972
122	CAP_MANC_122	Roadside	384386	396997
131	CAP_MANC_131	Roadside	384242	398040
152	CAP_MANC_152	Roadside	383500	397679
153	CAP_MANC_153	Roadside	383373	397723
155	CAP_MANC_155	Roadside	383603	397442
156	CAP_MANC_156	Roadside	383627	397472
157	CAP_MANC_157	Roadside	384090	397835
158	CAP_MANC_158	Roadside	384127	397851
159	CAP_MANC_159	Roadside	384096	397940
160	CAP_MANC_160	Roadside	384113	397947
161	CAP_MANC_161	Roadside	384079	397957
164	CAP_MANC_164	Roadside	384863	397397
165	CAP_MANC_165	Roadside	384995	397259
166	CAP_MANC_166	Roadside	384962	397301
167	CAP_MANC_167	Roadside	384920	397359
168	CAP_MANC_168	Roadside	385190	397167
183	CAP_MANC_183	Roadside	384140	397463
184	CAP_MANC_184	Roadside	384155	397472
185	CAP_MANC_185	Roadside	384119	397499
186	CAP_MANC_186	Roadside	384123	397530
MA112BNO	112	Roadside	383987	396735
MA113BNO	113	Roadside	385087	396891
MA29ANO	Oxford Street	Roadside	384119	397503
MA72NO	Lockton Close	Urban Background	384761	397384
MA77NO	Hewitt Street	Urban Background	383576	397489
MA82NO	Manchester Oxford Road	Roadside	384239	397276
MA83NO	Manchester Oxford Road	Roadside	384239	397276
MA84NO	Manchester Oxford Road	Roadside	384239	397276
MA96BNO	Ardwick Green	Roadside	385189	397167

Table 9: Diffusion tube monitoring results for annual mean NO₂ from 2019 to 2023

Site ID	Site Name	Annual Mean NO ₂ Concentration (µg/m ³)				
		2019	2020	2021	2022	2023
002	CAP_MANC_002	-	32.2	33.8	35.5	34.2
003	CAP_MANC_003	51.6	29.8	33.7	35.7	34.8
004	CAP_MANC_004	46.9	28.4	31.2	33.4	33.0
006	CAP_MANC_006	42.7	26.9	29.9	30.8	28.6

Site ID	Site Name	Annual Mean NO ₂ Concentration (µg/m ³)				
		2019	2020	2021	2022	2023
019	CAP_MANC_019	-	-	-	44.4	41.3
020	CAP_MANC_020	-	22.1	25.6	26.2	-
021	CAP_MANC_021	-	21.7	24.8	23.7	-
022	CAP_MANC_022	49.5	32.9	32.7	35.5	33.3
041	CAP_MANC_041	45.3	36.2	41.1	40.4	39.3
042	CAP_MANC_042	40.1	34	39.2	38.8	36.7
043	CAP_MANC_043	43.8	31.2	33.2	35.7	-
044	CAP_MANC_044	-	43.7	52.2	33.6	-
045	CAP_MANC_045	64.1	50	56.4	64.7	50.4
073	CAP_MANC_073	43.6	25.8	29.3	34.8	32.9
074	CAP_MANC_074	49.4	28.1	32.3	40.0	31.3
075	CAP_MANC_075	50.9	25.7	31.5	33.2	32.0
091	CAP_MANC_091	56.1	32.6	35.7	38.9	37.4
104	CAP_MANC_104	-	-	-	38.3	37.6
105	CAP_MANC_105	-	-	-	38.5	36.4
106	CAP_MANC_106	-	-	-	36.1	35.3
107	CAP_MANC_107	-	-	-	34.1	-
120	CAP_MANC_120	-	-	-	36.0	-
121	CAP_MANC_121	-	-	-	38.6	37.3
122	CAP_MANC_122	-	-	-	39.4	37.9
131	CAP_MANC_131	-	-	-	35.6	-
152	CAP_MANC_152	-	-	-	39.4	32.5
153	CAP_MANC_153	-	-	-	32.0	-
155	CAP_MANC_155	-	-	-	33.5	-
156	CAP_MANC_156	-	-	-	35.7	-
157	CAP_MANC_157	-	-	-	48.8	48.7
158	CAP_MANC_158	-	-	-	52.3	51.3
159	CAP_MANC_159	-	-	-	44.5	41.8
160	CAP_MANC_160	-	-	-	45.2	42.4
161	CAP_MANC_161	-	-	-	39.9	39.4
164	CAP_MANC_164	-	-	-	34.6	-
165	CAP_MANC_165	-	-	-	33.7	-
166	CAP_MANC_166	-	-	-	38.6	37.1
167	CAP_MANC_167	-	-	-	48.1	49.1
168	CAP_MANC_168	-	-	-	41.9	44.3
183	CAP_MANC_183	-	-	-	54.4	54.1
184	CAP_MANC_184	-	-	-	41.1	39.5
185	CAP_MANC_185	-	-	-	49.7	48.5
186	CAP_MANC_186	-	-	-	42.4	43.0

Site ID	Site Name	Annual Mean NO ₂ Concentration (µg/m ³)				
		2019	2020	2021	2022	2023
MA112BNO	112	-	-	21.4	22.7	19.8
MA113BNO	113	-	-	28.1	29.2	28.2
MA29ANO	Oxford Street	55.4	39	44.8	49.8	49.6
MA72NO	Lockton Close	32.8	24.5	27.5	26.3	24.3
MA77NO	Hewitt Street	43.7	26.9	30.8	33.1	31.6
MA82NO	Manchester Oxford Road	51.6	34.1	40.7	42.6	41.4
MA83NO	Manchester Oxford Road	50.4	33.4	40.7	42.6	41.4
MA84NO	Manchester Oxford Road	52	34.1	40.7	42.6	41.4
MA96BNO	Ardwick Green	46	36.4	41	43.5	46.1
Notes: - indicates no data was available. Results in bold denote exceedances of the air quality objective (40µg/m ³). Results in bold and <i>italic</i> denotes exceedances of 60µg/m³						

The map displays the city of Manchester with a focus on the area around the University of Manchester and Manchester Metropolitan University. A red rectangle highlights the specific site location near the intersection of Oxford Street and Market Street. A large blue circle represents the 1km buffer zone around this site. Numerous monitoring stations are marked with colored dots: orange dots represent LAQM Diffusion Tubes, and pink dots represent CAP Diffusion Tubes. These stations are distributed throughout the buffer zone, particularly along major roads like A6, A57, A503, and A56. Key landmarks include the University of Manchester, Manchester Metropolitan University, St George's Park, and several primary schools. Major roads such as Trinity Way, Deansgate, Hulme Street, and Grafton Street are clearly labeled. A legend in the top right corner provides a key for the symbols used: Site (red rectangle), AQMA (light green shaded area), Site 1km Buffer (blue circle), LAQM Diffusion Tubes (orange dot), Continuous Monitoring (blue square), and CAP Diffusion Tubes (pink dot). A scale bar at the bottom left indicates distances from 0 to 500 meters.

6.3.3 Defra Estimated Background Concentrations

Background concentrations refer to the existing levels of pollution in the atmosphere, produced by a variety of stationary and non-stationary sources, such as roads and industrial processes. The Defra website²⁶ includes estimated background pollutant concentrations for NO₂, NO_x, PM₁₀ and PM_{2.5} for each 1km by 1km OS grid square in the UK.

The Defra background pollutant concentrations for the OS grid square containing the Site (384500, 396500) are shown below in Table 10 for a baseline year (2023) and future year (2026). Concentrations are well below the annual mean air quality objectives for NO₂ (40µg/m³), PM₁₀ (40µg/m³) and PM_{2.5} (20µg/m³).

Table 10: Estimated background annual mean pollutant concentrations for 2023 and 2026

Year	OS Grid Square		Annual mean concentration (µg/m ³)		
	X	Y	NO ₂	PM ₁₀	PM _{2.5}
2023	384500	369500	20.4	11.7	7.7
2026	384500	369500	19.0	11.4	7.5

6.4 Baseline Summary

There is one AQMA within 1km of the Site. The situation at the Site is most similar to that of roadside diffusion tubes 121 and 122, at these monitoring sites, annual average NO₂ concentrations in the past two years are below the NO₂ annual mean objective (40µg/m³).

The PM₁₀ and PM_{2.5} monitoring and Defra background data indicate that concentrations are well below the annual air quality objectives.

It can be observed that the future annual mean background concentrations for 2026 are below the air quality standards for all pollutants. 2026 predicted concentrations are lower than 2023 as pollutant emissions are predicted to improve over time.

7. Construction Assessment

7.1 Construction Dust

This section provides the results of the assessment of potential impacts from construction dust generating activities on air quality. The Site will require demolition, construction, earthworks and associated trackout³².

7.1.1 Sensitive Receptors

Sensitive receptors are defined as those residential properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction and operation of a Site.

There are > 100 residential receptors within 25m of the Site, including high-rise student accommodation at Rosamund House adjacent to the Site, in addition to university buildings within 25m of the Site and St Philip's Church of England Primary School within 250m of the Site. The construction route will be via A57 and A5067 Higher Cambridge Street. There are more than 100 residential receptors within 50m of the construction traffic route. Residential properties, schools and university buildings are 'high sensitivity' receptors in accordance with the IAQM guidance²¹.

There are no ecological sites within 2km of the Site. Following IAQM guidance²¹ impacts on ecological receptors have therefore not been considered further in this assessment.

7.1.2 Dust Emission Magnitude

Each dust-generating activity has been assigned a dust emission magnitude.

The dust emission magnitudes associated with construction of the Site are outlined in Table 11. The reasoning column sets out the data provided by the Design team for each of the construction activities at the Site.

Table 11: Dust emission magnitude for construction activities at the Site

Activity	Dust emission magnitude	Reasoning
Demolition	Large	Demolition works involves total volume of existing building to be demolished to be >75,000m ³ , and involves potentially dusty material including concrete
Earthworks	Large	Total site area where earthworks might occur to be >110,000m ³
Construction	Large	Total volume of buildings constructed to be >75,000m ³
Trackout	Medium	Daily average of up to 50 HGV trips to/from site, with access to site from the west and east of the Site, using the A57 and A5067.

7.1.3 Sensitivity of the Area

There are > 100 high sensitivity receptors within 20m of the Site. As such, the areas sensitivity to dust soiling has been classified as *high* in accordance with the IAQM guidance²¹.

The Site is located in OS grid squares (384500, 396500) where the average Defra PM₁₀ background concentration was 11.7µg/m³ in 2023. This is below the 28.3µg/m³ threshold in the IAQM guidance²¹ therefore the sensitivity of the area to human health has been assigned as *medium*.

The construction dust buffers are presented in Figure 6

³² The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when HDVs leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

7.1.4 Risk of Impacts

Taking into consideration the dust emission magnitude and the sensitivity of the area, the risk of impacts has been classified and presented in Table 12. The risk for potential dust soiling impacts ranges from *medium to high*, while the risk to human health impacts is predicted to be *medium to high*.

Table 12: Summary dust risk table prior to mitigation for the Site

Activity	Dust soiling	Human health
Demolition	High risk	High risk
Earthworks	High risk	Medium risk
Construction	High risk	Medium risk
Trackout	Medium risk	Medium risk

Specific mitigation to minimise the risk of dust soiling and human health impacts from the Site is described in Section 8.

Following the implementation of appropriate mitigation, the potential impacts of dust soiling and potential impacts on human health should be negligible and therefore be not significant.

7.2 Non-Road Mobile Machinery

Construction impacts have the potential to result in dust nuisance or human health effects as result of the proposed works. Emissions from NRMM will be temporary and localised and controlled via the application of NRMM standards. An assessment of dust impacts for a high risk site has been undertaken following IAQM guidance²¹, therefore high risk mitigation options will be implemented on Site. It has been assumed that all NRMM will meet the relevant emissions standards and therefore their emissions are unlikely to give rise to significant effects on local air quality.

The Arup construction emissions toolkit can be used to calculate emissions from NRMM and help to plan for emissions reductions through procurement of cleaner equipment or operational management practices³³.

7.3 Construction Traffic

7.3.1 Proposed Development Impacts

The dispersion modelling has compared with predicted concentrations with and without the Proposed Development. The detailed results of the construction traffic modelling are presented in Appendix B.

7.3.1.1 NO₂ concentrations

Annual mean NO₂ concentrations are predicted to be below the air quality objective (40µg/m³) at all sensitive receptors. The highest predicted annual mean NO₂ concentration in the DS 2026 scenario is 34.8µg/m³ at receptor 11 Faculty of Science and Engineering university building, which is below the air quality objective. As annual mean NO₂ concentrations are predicted to be below 60µg/m³, particularly at receptors within close proximity to the Site it is also unlikely that the 1-hour NO₂ objective will be exceeded (200µg/m³ not to be exceeded more than 18 times a year).

The greatest increase in annual mean NO₂ concentration is 0.4µg/m³, predicted at receptor 14 School of Digital Arts adjacent to the Proposed development, with a total NO₂ concentration of 27.3µg/m³ in the DS scenario, and increase in traffic flow of 386 AADT as a result of the Proposed Development. Negligible

³³ Construction emissions toolkit (Arup) available at <https://www.arup.com/insights/air-quality-in-construction-innovations-in-reducing-polluting-emissions/>

impacts have been predicted at all receptors for annual mean NO₂ concentrations in accordance with the EPUK/IAQM guidance.

7.3.1.2 PM₁₀ and PM_{2.5} concentrations

Predicted annual mean concentrations for PM₁₀ at all modelled receptors are well below the relevant air quality objectives for 2026. The highest predicted annual mean concentrations in the DS 2026 scenario is 13.4µg/m³ for PM₁₀, predicted at receptor 11 Faculty of Science and Engineering university building.

The greatest increase in annual mean PM₁₀ concentration is less than 0.1µg/m³, predicted at multiple receptors. Negligible impacts have been predicted at all receptors for annual mean PM₁₀ in accordance with the EPUK/IAQM guidance.

The predicted annual mean concentrations for PM_{2.5} meet the interim target (12µg/m³, to be achieved by 31 January 2028) at all receptors. In addition, the predicted annual mean concentrations for PM_{2.5} at all receptors also meet the 10µg/m³ legal target to be achieved by 2040. The highest predicted annual mean concentrations in the DS 2026 scenario is 8.5µg/m³ for PM_{2.5}, predicted at receptor 11 Faculty of Science and Engineering university building.

The change in annual mean PM_{2.5} concentrations is less than 0.1µg/m³ at all modelled receptors. Negligible impacts have been predicted at all receptors for annual mean PM_{2.5} concentrations in accordance with the EPUK/IAQM guidance.

7.3.2 Assessment of Significance

The magnitude of change for annual mean NO₂, PM₁₀ and PM_{2.5} concentrations at all receptors is predicted to be negligible and therefore the overall effect is not significant.

8. Operational Assessment

8.1 Exposure Assessment

The Site is within Greater Manchester Combined Authority AQMA for the area covering Manchester City Centre, the area around Manchester Airport and the main arterial traffic routes in the city, declared due to exceedances of annual average NO₂ concentrations.

The baseline air quality conditions, presented in Section 6 indicates that the Site is not in an area of existing poor air quality. The monitoring and background data indicates that the concentrations of the pollutants of key concern (NO₂, PM₁₀ and PM_{2.5}) are sufficiently below the national air quality standards, see Table 5 to Table 10 for further information.

On this basis, we can advise that the local air quality does not create risk of high levels of exposure to air quality for residents and the local air quality does not need to be considered a constraint for the ventilation strategy. We would recommend however that where possible, measures are considered to reduce air quality impacts and air intakes are considered at the highest levels of the building, such as on the rooftop, to reduce the impact of the air quality on the future occupants.

9. Mitigation

9.1.1 Construction Dust Mitigation

The dust emitting activities assessed can be greatly reduced or eliminated by applying the site-specific mitigation measures. As *high risk* has been determined for the construction activities, relevant high risk measures are applicable to general measures and measures applicable specifically to demolition, construction, and earthworks, and relevant medium risk measures are applicable to trackout.

Relevant high risk measures have been provided for this construction activity according to the IAQM guidance²¹.

General

- Display the name and contact details of person(s) accountable for air quality and dust issues on the Site boundary. This may be the environment manager/engineer or the site manager.
- Develop and implement a Dust Management Plan, which will include measures to control other emissions, approved by the local authority.
- Display the head or regional office contact information.
- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, both on- or off-site and the action(s) taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby. Including regular dust soiling checks of surfaces within 100m of the site boundary. This step is desirable.
- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results and make an inspection log available to the local authority, when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations, if necessary, with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Site Maintenance

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as practical or possible.

- Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on Site.
- Fully enclose site or specific operations where there is a high potential for dust production and 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.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all on-road vehicles comply with the requirements of London Low Emission Zone and the London NRMM standards.
- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum speed limit of 15mph on surfaced roads and 10mph on unsurfaced haul roads and work areas.
- Implement a Travel Plan that support and encourages sustainable travel.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques, such as water sprays or local extraction.
- 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 the 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

- No bonfires or burning of waste materials.

Measures specific to Demolition

- Soft strip inside buildings before demolition.
- Ensure effective water suppression is used during demolition operations. Hand held 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.
- No explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Measure specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil to stockpiles to stabilise surfaces as soon as practicable
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or over with topsoil, as soon as practicable
- Only remove the cover in small areas during work and not all at once

Measures Specific to Construction

- Avoid scabbling if possible.
- Ensure sand and other aggregates 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.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplied of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) 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.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system.
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

10. Conclusions

This report presents the air quality assessment for the proposed residential development at Cambridge Halls, in Manchester.

The report includes a review of current legislation, planning policy and a baseline assessment describing the current air quality conditions in the vicinity of the site. The Site is not considered to contradict policy or legislation relating to air quality.

The available air quality data indicates that the annual mean NO₂, PM₁₀ and PM_{2.5} concentrations will be below the relevant air quality objectives at the Site.

Regarding ventilation, as the local air quality does not create risk of high levels of exposure therefore does not need to be considered a constraint for the ventilation strategies. However, it is recommended that where possible, measures are considered to reduce air quality impacts and air intakes are considered at the highest levels of the building to reduce the impact of the air quality on the future occupants.

Construction dust impacts have been considered and assessed using the qualitative approach described in the latest IAQM guidance²¹. It has been concluded that with the appropriate best practice mitigation measures suitable for high risk sites in place, there is likely to be a negligible effect on existing receptors from the dust-generating activities onsite.

There are no air quality impacts associated with the operational emissions or traffic related with the development as the development is fully electric and car-free.

Overall, it is considered that air quality is not significant and therefore not a material consideration in relation to the Site.

Appendix A

Construction Dust Assessment Methodology

A.1 Construction Dust Assessment Methodology

The construction phase effects of the Proposed Development have been assessed using the qualitative approach described in the latest guidance by the Institute of Air Quality Management (IAQM)²¹. The guidance applies to the assessment of dust from construction/demolition activities.

An ‘impact’ is described as a change in pollutant concentrations or dust deposition, while an ‘effect’ is described as the consequence of an impact. The main impacts that may arise during construction of the Proposed Development are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes;
- Elevated PM₁₀, PM_{2.5} concentrations from demolition and construction activities; and
- An increase in NO₂ and PM₁₀ (including PM_{2.5}) concentrations due to exhaust emissions from Non-Road Mobile Machinery (NRMM) and vehicles accessing the site.

The IAQM guidance considers the potential for dust emissions from dust-generating activities, such as demolition of existing structures, earthworks, construction of new buildings and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on-site and then transfer dust and dirt onto the public road network.

For each of these dust-generating activities, the guidance considers three separate effects:

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

The receptors can be human or ecological and are selected based on their sensitivity to dust soiling and PM₁₀ exposure. Sensitive receptors are defined as those properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction of the proposed development.

The methodology takes into account the scale at which the above effects are likely to be generated (classed as small, medium or large), the levels of background PM₁₀ concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of the potential impacts on local air quality as a result of the construction works.

There are five steps in the assessment process described in the IAQM guidance, this is summarised in Figure 7 with further description provided in the following paragraphs.

Step 1: Need for assessment

The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 250m of the site boundary of the scheme (for ecological receptors that is 50m) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 250m from the site entrance(s).

For specific (high risk) schemes the planning authority may require a dust assessment despite the proposed site falling outside the distances above.

Step 2: Assess the risk of dust impacts

This step is split into three sections as follows:

- 2A. Define the potential dust emission magnitude;
- 2B. Define the sensitivity of the area; and
- 2C. Define the risk of impacts.

Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria presented in Table A1 (Appendix A.1).

The sensitivity of the surrounding area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM₁₀ background concentrations and any other site-specific factors. Table A2 to Table A4 (Appendix A.2 - A.4) show the criteria for defining the sensitivity of the area to different dust effects.

The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures (Table A5, Appendix A.5) and an overall risk for the site derived.

Step 3: Determine the site-specific mitigation

Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

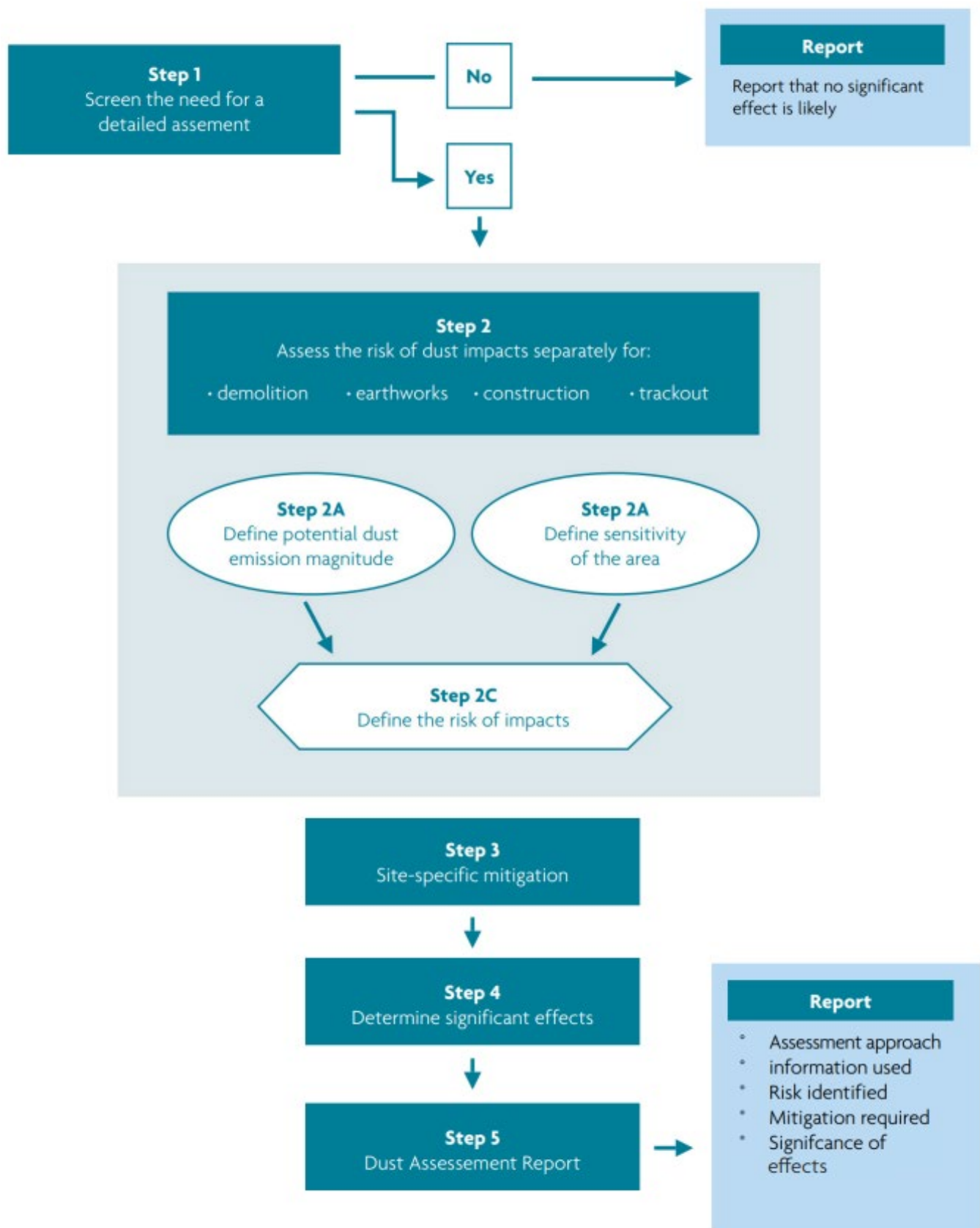
Step 4: Determine any significant residual effects

Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases.

Step 5: Prepare a dust assessment report

The last step of the assessment is the preparation of a Dust Assessment Report. This forms part of this report in Section 7.

Figure 7: IAQM dust methodology²¹



A.2 Dust Emission Magnitude

Table A1: Dust Emission Magnitude

Small	Medium	Large
Demolition		
- total building volume <12,000m³ - construction material with low potential for dust release (e.g. metal cladding or timber) - demolition activities <6m above ground - demolition during wetter months	- total building volume 12,000 - 75,000m³ - potentially dusty construction material - demolition activities 6-12m above ground level	- total building volume >75,000m³ - potentially dusty construction material (e.g. concrete) - on-site crushing and screening - demolition activities >12m above ground level
Earthworks		
- total site area <18,000m² - soil type with large grain size (e.g. sand) <5 heavy earth moving vehicles active at any one time - formation of bunds <4m in height	- total site area 18,000m² – 110,000m² - moderately dusty soil type (e.g. silt) 5 – 10 heavy earth moving vehicles active at any one time - formation of bunds 3 - 6m in height	- total site area >110,000m² - potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) >10 heavy earth moving vehicles active at any one time - formation of bunds >6m in height
Construction		
- total building volume <12,000 m³ - construction material with low potential for dust release (e.g. metal cladding or timber)	- total building volume 12,000 - 75,000m³ - potentially dusty construction material (e.g. concrete) - on-site concrete batching	- total building volume >75,000m³ - on-site concrete batching - sandblasting
Trackout		
<20 HDV (>3.5t) outward movements in any one day - surface material with low potential for dust release - unpaved road length <50m	20 – 50 HDV (>3.5t) outward movements in any one day - moderately dusty surface material (e.g. high clay content) - unpaved road length 50 – 100m	>50 HDV (>3.5t) outward movements in any one day - potentially dusty surface material (e.g. high clay content) - unpaved road length >100m

A.3 Sensitivity of the Area to Dust Soiling Effects

Table A2: Sensitivity of the area to dust soiling effects

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 350
High	> 100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 350
Low	> 1	Low	Low	Low	Low

A.4 Sensitivity of the Area to Human Health Impacts

Table A3: Sensitivity of the area to human health impacts

Receptor Sensitivity	Background PM ₁₀ concentrations (annual mean)	Number of receptors	Distance from the source (m)			
			< 20	< 50	< 100	< 250
High	> 32µg/m ³	> 100	High	High	High	Medium
		10 – 100			Medium	Low
		1 - 10		Medium	Low	
	28 – 32µg/m ³	> 100	High	High	Medium	Low
		10 – 100		Medium	Low	
		1 - 10				
	24 – 28µg/m ³	> 100	High	Medium	Low	Low
		10 – 100				
		1 - 10	Medium	Low		
	< 24µg/m ³	> 100	Medium	Low	Low	Low
		10 – 100	Low			
		1 - 10				
Medium	> 32µg/m ³	> 10	High	Medium	Low	Low
		1 - 10	Medium	Low		
	28 – 32µg/m ³	>10	Medium	Low	Low	Low
		1 -10	Low			
	24 – 28µg/m ³	>10	Low	Low	Low	Low
		1 -10				
	< 24µg/m ³	>10	Low	Low	Low	Low
		1 -10				
Low	–	≤ 1	Low	Low	Low	Low

A.5 Sensitivity of the Area to Ecological Impacts

Table A4: 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

A.6 Risk of Dust Impacts

Table A5: Risk of Dust Impacts

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible

Appendix B

B.1 Road Traffic Data

Construction traffic data obtained from the project transport consultants used in the dispersion modelling is presented in Table B1. Speed data in kph were provided for each traffic links. The road links were modelled at a reduced speed of 20kph, to reflect queuing and congestion, in accordance with the Defra's LAQM TG22¹⁷.

Table B1: Construction traffic data

Road ID	Road name	Speed (kph) (Modelled Speed (kph))	2023 Baseline		2026 Do-Minimum		2026 Do-Something (Proposed Development only)	
			AADT	% HDV	AADT	% HDV	AADT	% HDV
R1	A5067	32 (20)	17114	0.5	17337	0.5	17724	1.1
R2	A57(M)	64 (20)	44129	3	44705	3.3	45448	3.5

B.2 Model Verification

Monitoring site 042 (CAP_MAN_042) located along A57 (M) Mancunian Way has been used in the model verification exercise, which is a roadside location.

Model verification has been undertaken for road sources as this requires comparison of modelled concentrations against monitored concentrations. A comparison of the monitored and modelled data is shown in Table B1.

Table B1: Comparison of modelled and monitored annual mean NO₂ for 2023

Site name	Pollutant	Monitored concentration (µg/m ³)	Unadjusted Modelled concentration (µg/m ³)	Difference of modelled vs monitored (%)
042	NO ₂	36.7	26.8	-27.0%

The verification process showed that the model was underpredicting at by -27.0%. The model is considered to be underpredicting due to lack of detail and uncertainties in the traffic data and speeds to model the complexities of the A57 road link. There are also limitations to only having one verification site, as there may be uncertainty in the monitoring data. To account for the model performance a road NO_x verification factor of 3.3 was used. Using this factor meets requirements of Defra's LAQM TG22¹⁷ and has been considered suitable for use in the assessment.

The verification factor and adjusted modelled NO₂ concentration is presented in Table C2. A graphical representation before and after adjustment are shown in Figure C1 and Figure C2.

Table C2: Comparison of adjusted modelled and monitored annual mean for 2023

Site name	Pollutant	Modelled road NO _x (µg/m ³)	Monitored road NO _x (µg/m ³)	Ratio of Monitored Road NO _x / Modelled Road NO _x	Adjusted Modelled NO ₂ Concentration (µg/m ³)	Difference of modelled vs monitored (%)
042	NO ₂	9.1	29.7	3.26	34.5	-6.0%

Figure C1: Monitored and modelled annual mean NO₂ concentrations before adjustment

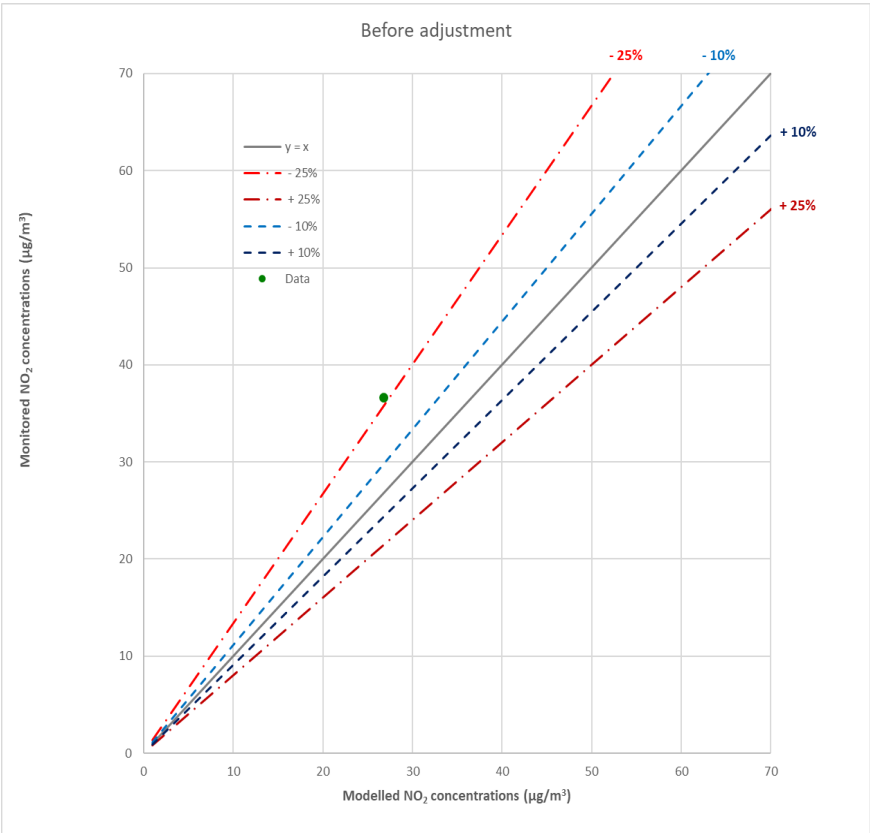
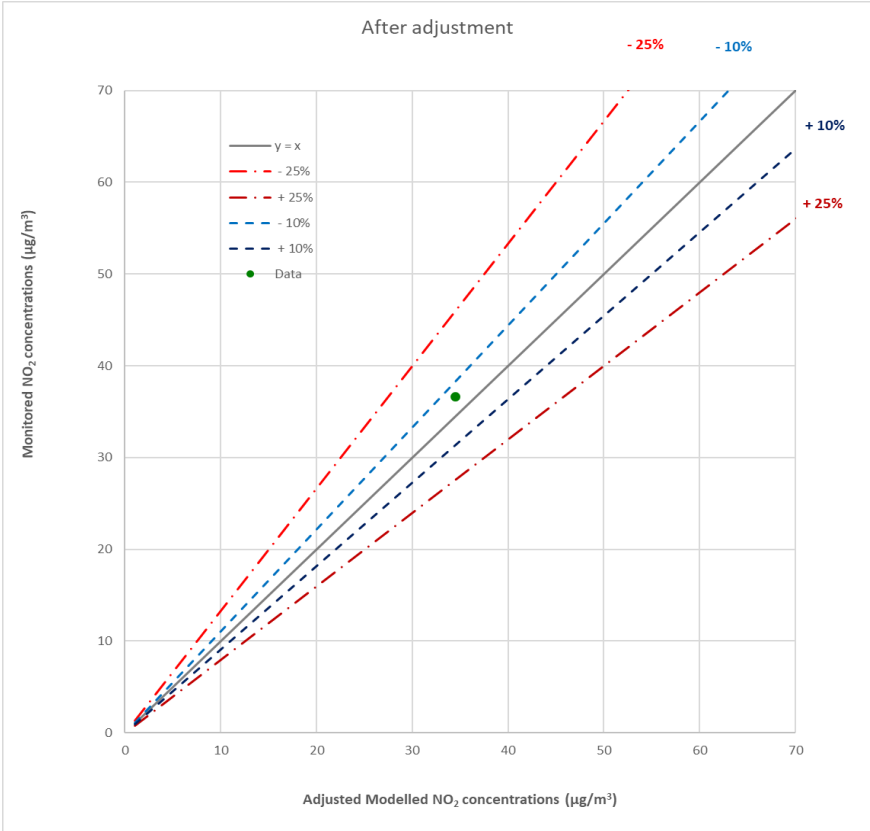


Figure C2: Monitored and modelled annual mean NO₂ concentrations after adjustment



B.3 Construction Traffic Results

This section details the model results for the operational traffic generated by the Proposed Development.

Table D1: Predicted annual mean NO₂ concentrations at assessed receptors for construction traffic, Proposed Development only

Receptor ID	'Do Nothing' NO ₂ (µg/m ³)	Peak Construcion NO ₂ (µg/m ³)	Change	Impact descriptor
1	20.6	20.6	<0.1	Negligible
2	25.3	25.5	0.1	Negligible
3	24.0	24.2	0.1	Negligible
4	34.3	34.6	0.3	Negligible
5	25.1	25.2	0.1	Negligible
6	27.3	27.6	0.2	Negligible
7	27.8	28.0	0.3	Negligible
8	25.6	25.9	0.3	Negligible
9	25.5	25.8	0.3	Negligible
10	23.4	23.7	0.2	Negligible
11	34.5	34.8	0.3	Negligible
12	23.7	24.0	0.2	Negligible
13	26.6	26.9	0.3	Negligible
14	26.9	27.3	0.4	Negligible
15	25.6	25.8	0.2	Negligible
16	26.3	26.4	0.2	Negligible

Table D2: Predicted annual mean PM₁₀ concentrations at assessed receptors for construction traffic, Proposed Development only

Receptor ID	'Do Nothing' PM ₁₀ (µg/m ³)	Peak Construction PM ₁₀ (µg/m ³)	Change	Impact descriptor
1	11.6	11.6	<0.1	Negligible
2	12.2	12.2	<0.1	Negligible
3	12.0	12.0	<0.1	Negligible
4	13.4	13.4	<0.1	Negligible
5	12.2	12.2	<0.1	Negligible
6	12.4	12.5	<0.1	Negligible

Receptor ID	'Do Nothing' PM ₁₀ (µg/m³)	Peak Construction PM ₁₀ (µg/m³)	Change	Impact descriptor
7	12.5	12.5	<0.1	Negligible
8	12.2	12.3	<0.1	Negligible
9	12.2	12.3	<0.1	Negligible
10	12.0	12.0	<0.1	Negligible
11	13.4	13.4	<0.1	Negligible
12	12.0	12.0	<0.1	Negligible
13	12.4	12.4	<0.1	Negligible
14	12.4	12.5	<0.1	Negligible
15	12.2	12.2	<0.1	Negligible
16	12.3	12.3	<0.1	Negligible

Table D3: Predicted annual mean PM_{2.5} concentrations at assessed receptors for construction traffic, Proposed Development only

Receptor ID	'Do Nothing' PM _{2.5} (µg/m³)	Peak Construction PM _{2.5} (µg/m³)	Change	Impact descriptor
1	7.6	7.6	<0.1	Negligible
2	7.9	7.9	<0.1	Negligible
3	7.8	7.8	<0.1	Negligible
4	8.5	8.5	<0.1	Negligible
5	7.9	7.9	<0.1	Negligible
6	8.0	8.0	<0.1	Negligible
7	8.1	8.1	<0.1	Negligible
8	7.9	7.9	<0.1	Negligible
9	7.9	7.9	<0.1	Negligible
10	7.8	7.8	<0.1	Negligible
11	8.5	8.5	<0.1	Negligible
12	7.8	7.8	<0.1	Negligible
13	8.0	8.0	<0.1	Negligible
14	8.0	8.0	<0.1	Negligible
15	7.9	7.9	<0.1	Negligible
16	8.0	8.0	<0.1	Negligible