

Air Quality Assessment Report

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Executive Summary

Hilson Moran has been instructed by Great Places Housing Association, to undertake an Air Quality Impact Assessment (AQIA) for the Proposed Development at Downley Drive, Manchester.

The Proposed Development will deliver sixty-eight Affordable Homes, comprising of twenty-three houses and forty-five apartments within a four-storey buildings, alongside associated landscaping, boundary treatment, car parking, and cycle parking

This report presents the findings of the air quality assessment, which addresses the potential air quality impacts during both the construction and operational stages of the Proposed Development. The assessment has been undertaken in line with the relevant policy and guidance, and where necessary outlines the required mitigation measures to minimise impacts.

A qualitative assessment of construction phase impacts has been carried out. There is a medium risk of dust soiling and a low to negligible risk of fugitive PM₁₀ emissions during the construction phase. Through good site practice, the implementation of suitable mitigation measures, the impact of dust and PM₁₀ releases will be minimised. The residual effect of the construction phase on air quality is therefore not significant.

The site is not located within an existing Air Quality Management Area (AQMA), however development generated road traffic may travel along roads that are within the existing Greater Manchester AQMA. Therefore, a detailed assessment of operational road traffic has been undertaken to consider the potential impact on NO₂, PM₁₀ and PM_{2.5} concentrations at existing and proposed receptor locations. The findings of the assessment indicate compliance with the annual AQS objectives for NO₂, PM₁₀ and PM_{2.5} at all modelled receptors. Furthermore, no exceedances were predicted at any of the modelled receptors with regards to the 1-hour NO₂ and 24-hour PM₁₀ AQS objectives.

There is no proposed onsite combustion plant (Combined Heat and Power, boilers etc.) for the provision of heating and hot water, therefore an assessment of this source has been scoped out.

Based on the findings of the assessment site specific mitigation to protect existing receptors and future users of the Proposed Development from poor air quality are not required. However, there are a number high level measures that should be incorporated into the scheme to promote sustainable travel and best practice (see Section 6.2.1).

The residual effect is not significant.

Overall, with the recommended mitigation measure in place (construction phase only), the proposals would be compliant with legislation and policy.

1. Introduction

Hilson Moran has been instructed by Great Places Housing Association, to undertake an Air Quality Impact Assessment (AQIA) for the Proposed Development at Downley Drive, Manchester.

The Site is bounded by St Vincent Street and the Rochdale Canal to the north, edges of existing dwellings on Woodward Place to the west, Downley Drive to the south and Kingham Drive to the east. The western portion of the Site is currently vacant and secured by fencing, comprising predominantly of overgrown shrub land with a limited amount of hard standing. The eastern portion of the Site is comprised of grassland with a limited number of trees. An un-adopted path cuts through the Site from St Vincent Street to the north to Downley Drive to the South. The Site is illustrated in **Figure 1** (included at the end of the report), hereafter referred to as the 'Proposed Development' or 'Application Site'.

1.1. Proposed Development

The Proposed Development will deliver sixty-eight Affordable Homes, comprising of twenty-three houses and forty-five apartments within a four-storey buildings, alongside associated landscaping, boundary treatment, car parking, and cycle parking.

1.2. Potential Impacts

This report presents the findings of the AQIA for both the operational and construction phases. During the construction phase, activities on the Application Site could give rise to dust, which, if transported beyond the site boundary, could have an adverse effect on local air quality and cause a statutory 'nuisance'. During the operational phase, emissions from road traffic has the potential to affect local pollution levels at existing and proposed receptors. For both phases, the impacts are identified and the mitigation measures that should be implemented to minimise the impact are described.

A glossary of terms is provided in **Appendix A**.

2. Legislation, Policy and Guidance

2.1. Legislation

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

2.1.1. Air Quality Strategy for England, Scotland, Wales and Northern Ireland

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland¹, most recently updated in July 2007. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that the European Union and International agreements are met in the UK.

The AQS covers the following air pollutants: ammonia (NH₃), benzene (C₆H₆), 1,3 butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), oxides of nitrogen (NO_x) (including nitrogen dioxide (NO₂)), particulate matter (PM₁₀ and PM_{2.5}), sulphur dioxide (SO₂), ozone (O₃) and polycyclic aromatic hydrocarbons (PAHs).

The AQS sets standards and objectives for the listed pollutants for the protection of human health, vegetation and ecosystems. The standards are based on recommendations by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) based on current understanding and scientific knowledge about the effects of air pollution on health and the environment. The air quality objectives are policy based targets set by the UK Government that are often expressed as maximum concentrations not to be exceeded either without exception or with a limited number of exceedances within a specified timescale.

For the pollutants considered in this assessment, there are both a long-term (e.g. annual mean) and short-term (e.g. one hour mean) standard. In the case of NO₂, the short-term standard is for a 1-hour averaging period (no more than 18 exceedances of 200 µg/m³ per year), whereas for PM₁₀ it is a 24-hour averaging period (no more than 35 exceedances of 50 µg/m³ per year). The variation in time period reflects the varying impacts on health of differing exposures to pollutants.

2.1.2. Air Quality Standards Regulations

The air quality objectives in the AQS are statutory in England with the Air Quality (England) Regulations 2000² and the Air Quality (England) (Amendment) Regulations 2002³ for the purpose of Local Air Quality Management (LAQM).

The Regulations require likely exceedances of the AQS objectives to be assessed in relation to:

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

The Air Quality Standards (Amendment) Regulations 2016⁴ transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England, with the Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 ensuring continuation of the transposition of the Directive. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as NO₂, PM₁₀ and PM_{2.5}. The limit values for NO₂ and PM₁₀ are the same concentration levels as the relevant AQS objectives and the limit value for PM_{2.5} is a concentration of 25 µg/m³. The relevant air quality objectives are presented in Table 2.1.

Table 2.1 Air Quality Objectives for Relevant Pollutants

Pollutant	Concentration	Measured as
NO ₂	200 µg/m ³	1-hour mean, not to be exceeded more than 18 times a year (99.79 %ile)
	40 µg/m ³	Annual mean
PM ₁₀	50 µg/m ³	24-hour mean, not to be exceeded more than 35 times a year (90.41 %ile)
	40 µg/m ³	Annual mean
PM _{2.5}	25 µg/m ³	Annual mean

2.1.1. Environment Act

Part IV of the Environment Act 1995⁵ requires local authorities to periodically review and assess the quality of air within their administrative area. The reviews have to consider both the air quality at the time of review and likely future air quality during the 'relevant period' and whether any air quality objectives prescribed in regulations are being achieved or are likely to be achieved in the future. Where the objectives are not likely to be achieved, an authority is required to designate an Air Quality Management Area (AQMA). For each designated AQMA the local authority is required to produce an Air Quality Action Plan (AQAP) that works to ensure compliance with the objectives by implementing a number of air quality improvement measures.

2.1.2. Environmental Protection Act 1990

Section 79 of the Environmental Protection Act 1990 (as amended)⁶ makes provision for the identification and control of statutory nuisances. The Act identifies statutory nuisance, in relation to air quality, as:

- 'Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance'; and,
- 'Any accumulation or deposit which is prejudicial to health or a nuisance'.

As a result, the level at which a nuisance occurs is highly variable and dependent on perception, with effects influenced by existing conditions and the degree of change that has occurred.

Where a statutory nuisance has been demonstrated the local authority must serve an abatement notice, non-compliance with which would constitute a legal offence. The abatement notice may prevent or restrict occurrence or re-occurrence of the nuisance or the local authority may, itself, undertake action to abate the nuisance and recover any associated expenses.

2.2. Planning Policy

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

2.2.1. National

2.2.1.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF)⁷ sets out policies, which apply to the preparation of local plans and to development management decisions. This framework sets out the Government's economic, environmental and social planning policies for England. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

The NPPF sets out the Government's planning policies on the conservation and enhancement of the natural environment, with the following paragraphs relating to air quality:

- Paragraph 8c, which states *'to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy'*;
- Paragraph 54, which states *'Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition'*;
- Paragraph 103, which states *'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 170e, which states *'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans'*;
- Paragraph 181, which states *'Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan'*;
- Paragraph 183, which states *'The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities'*; and,
- Paragraph 205c, which states *'ensure that any unavoidable noise, dust and particulate emissions and any blasting vibrations are controlled, mitigated or removed at sources, and establish appropriate noise limits for extraction in proximity to noise sensitive properties'*.

2.2.2. Local Planning Policy

2.2.2.1. Manchester Local Plan

Local planning policy is provided in Manchester City Council's Local Plan, with the Core Strategy Development Plan Document⁸ comprising the key document in the Local Plan outlining the

Council's vision for Manchester in 2027 and identifying the planning policies, which will be used to deliver that vision.

The main planning policy relating to air quality is provided by Policy EN16 of the Core Strategy, which states that

"...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."

Further this, Policy EN7 on energy infrastructure opportunities identifies that

"...there will be a presumption in favour of low and zero carbon decentralised energy schemes, subject to the following considerations... the cumulative impact of energy schemes will be taken into account when consideration applications, to include modelled impacts on air quality and landscape character, with reference to Policy EN16."

2.2.3. Guidance

2.2.3.1. National Planning Practice Guidance

The NPPF is supported by Planning Practice Guidance⁹, which outlines how the planning process can address potential air quality impacts associated with new development. It provides guidance on the level of detail required, how impacts can be mitigated and provides information on how local authorities may take air quality as a specific consideration in a planning decision.

2.2.3.2. Local Air Quality Management Review and Assessment Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities. This technical guidance, identified as LAQM.TG¹⁰, is for used by local authorities for their review and assessment work and has been applied where appropriate to this assessment.

2.2.3.3. Land-Use Planning and Development Control: Planning for Air Quality

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance¹¹, which offers advice as to when an air quality assessment may or may not be required. The guidance document details what should be included within an assessment, how to determine the significance of impacts and the likely mitigation measures required to minimise the impacts.

2.2.3.4. Guidance on the Assessment of Dust from Demolition and Construction

This document¹², published by the IAQM, provides guidance on how to assess the impact of construction activities on air quality associated with new developments. The methodology prescribed within the document allows the impacts to be categorised based on risk (with particular reference to dust and PM₁₀ on sensitive human and ecological receptors) and, where applicable, identify mitigation measures associated to the risk classification determined.

3. Assessment Methodology

3.1. Scope of the Assessment

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

- Consultation with the Environmental Health Officer (EHO) at MCC to agree the scope of the assessment and the methodology to be applied;
- Review of MCC's latest review and assessment reports and the air quality data for the area surround the Application Site, including MCC and Defra;
- Desk study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality, and a review of the masterplan for the Development to establish the location of new sensitive receptors; and,
- Review of the traffic data provided by Ashley Helme Associates (the Applications Transport Consultant).

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

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

It is understood that there is no proposed onsite combustion plant including Combined Heat and Power (CHP) Units, gas-fired boilers or diesel generators for the provision of heating and hot water, therefore an assessment of this source has been scoped out.

3.2. Construction Phase

Assessment of the risk of impact associated with the generation of dust during the construction phase of the Proposed Development and determination of subsequent mitigation measures necessary has been undertaken following IAQM guidelines.

The assessment is based on a series of steps: screening the requirement for a detailed assessment, classification of the likely magnitude of dust emissions; characterisation of the area of influence and establishment of its sensitivity to dust; and establishment of the overall risk of impact. The risk of impact from dust emissions from the Proposed Development considers effects on human health, nuisance as a result of dust soiling and ecological receptors from four main activities: demolition; earthworks; construction; and trackout. The potential for dust emissions from each activity should be considered, unless any of them are not relevant to the Proposed Development.

3.2.1. Identification of Receptors

The guidelines identify appropriate screening criteria for the identification of potential receptors, based on a conservative approach and in consideration of the exponential decline in both airborne concentrations and the rate of deposition with distance. A detailed assessment of the impact of dust from construction sites will be required where:

- A 'human receptor' is located within 350 m of the boundary of the site or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance;

- An 'ecological receptor' is located within 50 m of the boundary of the site or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance.

3.2.2. Identification of Impact Magnitude

The magnitude of dust emissions for each activity is classified as small, medium or large depending upon the scale of the works proposed, materials involved and level of activity required. The IAQM guidelines provide examples of how the magnitude of emission can be defined, which are identified in Table 3.1. The Proposed Development is unlikely to satisfy all criteria within the examples, therefore professional judgement and site specific information are used to identify appropriate emission magnitude.

Table 3.1 *Dust Emission Magnitude (Source: IAQM Guidance, v1.1 Updated June 2016)*

Activity	Small	Medium	Large
Demolition	• Total building volume <20,000 m³ • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities <10 m above ground level • Demolition during wetter months	• Total building volume 20,000 – 50,000 m³ • Potentially dusty construction material • Demolition activities 10-20 m above ground level	• Total building volume >50,000 m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities >20 m above ground
Earthworks	• Total site area <2,500 m² • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <4 m in height • Total material moved <20,000 tonnes • Earthworks during wetter months	• Total site area 2,500 – 10,000 m² • Moderately dusty soil type (e.g. silt) • 5-10 heavy earth moving vehicles active at any one time • Formation of bunds 4-8 m in height • Total material moved 20,000-100,000 tonnes	• Total site area >10,000 m² • Potentially dusty soil type (e.g. clay) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >8m in height • Total material moved >100,000 tonnes
Construction	• Total building volume <25,000 m³ • Construction material with low potential for dust (e.g. metal cladding or timber)	• Total building volume 25,000 – 100,000 m³ • Potentially dusty construction material (e.g. concrete) • On-site concrete batching	• Total building volume >100,000 m³ • On-site concrete batching, sandblasting

Activity	Small	Medium	Large
Trackout	• <10 HDV (>3.5t) outward movements* in any one day[#] • Surface material with low potential for dust release • Unpaved road length <50 m	• 10 – 50 HDV (>3.5t) outward movements* in any one day[#] • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50 – 100 m	• >50 HDV (3.5t) outward movements* in any one day[#] • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100 m
* A vehicle movement is a one way journey, i.e. from A to B, and excludes the return journey # HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.			

3.2.3. Identification of Receptor Sensitivity

Consideration is given to the likely sensitivity of the area to the impacts of dust, establishing a sensitivity of low, medium or high for dust soiling, human health and ecological receptors. The sensitivity of the area considers a number of factors, including the specific sensitivities of receptors in the area, the proximity and number of those receptors, local baseline conditions such as background concentrations and site specific factors.

The first step in identifying the sensitivity of the area is to establish the sensitivity of the receptor, based on the presence or level of activity associated with the area of influence of the Proposed Development. Professional judgement and site specific information are used to assign an appropriate level of receptor sensitivity using the principles outlined in Table 3.2. Following this, the sensitivity of the area can be established from Tables 3.3 to 3.5 based on the sensitivity of the receptor, number of receptors (in the case of human health and dust soiling) and the distance from source.

Table 3.2 *Receptor Sensitivity Definitions (Source: IAQM Guidance, v1.1 Updated June 2016)*

Impact	Low	Medium	High
Dust Soiling	• Enjoyment of amenity would not reasonably be expected; • There is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; • Transient exposure, where people or property is only expected to be present for limited periods of time as part of the normal pattern of use; • Indicative examples include playing fields, farmland, footpaths, short-term car parks and roads.	• Users would expect to enjoy a reasonable level of amenity, but not reasonably at same level as in their home; • The appearance, aesthetics or value of property could be diminished by soiling; • Indicative examples include parks and places or work.	• Users can reasonably expect enjoyment of a high level of amenity; • The appearance, aesthetics or value of property would be diminished by soiling, and continuous or regularly extended periods of presence expected during normal pattern of land use; • Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.

Impact	Low	Medium	High
Human Health	- Locations where human exposure is transient; - Indicative examples include public footpaths, playing fields, parks and shopping streets.	- Locations where people exposed are workers[#], and exposure is over a time period relevant to the air quality objective for PM₁₀*; - Indicative examples including office and shop workers, but not those occupationally exposed to dust.	- Locations where members of the public are exposed over a period of time relevant to the air quality objective for PM₁₀*; - Indicative examples include residential properties, hospitals, schools and residential care homes.
Ecological	Locations with a local designation where the features may be affected by dust deposition, <i>e.g.</i> Local Nature Reserve.	- Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; - Locations with a national designation where the features may be affected by dust deposition, <i>e.g.</i> Site of Special Scientific Interest.	- Locations with an international or national designation and the designated features may be affected by dust soiling, <i>e.g.</i> Special Area of Conservation with acid heathland; - Location where there is a community of a particularly dust sensitive species such as vascular species including in the Red Data List for Great Britain.
* In the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day, following Defra Guidance. # Workers are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children, are not normally workers.			

Table 3.3 *Sensitivity of the Area to Dust Soiling Effects on People and Property (Source: IAQM Guidance, v1.1 Updated June 2016)*

Receptor Sensitivity	Number of Receptors	Distance from Source			
		<20m	<50m	<100m	<350m
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 3.4 *Sensitivity of the Area to Human Health Impacts (Source: IAQM Guidance, v1.1 Updated June 2016)*

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from Source				
			<20m	<50m	<100m	<200m	<350m
High	>32 µg/m ³	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 – 32 µg/m ³	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 – 28 µg/m ³	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	<24 µg/m ³	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	>32 µg/m ³	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	28 – 32 µg/m ³	>10	Medium	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	24 – 28 µg/m ³	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	<24 µg/m ³	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table 3.5 *Sensitivity of the Area to Ecological Impacts (Source: IAQM Guidance, v1.1 Updated June 2016)*

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

3.2.4. Establishing Significance

The risk of dust related impacts from the Proposed Development is established from the sensitivity of the area and the likely dust emission magnitude. The risk should be established, on the worst-case area sensitivity and in the absence of mitigation, for each of the construction related activities (demolition, earthworks, construction and trackout) following the matrix in Table 3.6.

Table 3.6 *Risk of Dust Impacts from Each Activity (Source: IAQM Guidance, v1.1 Updated June 2016)*

Sensitivity of Area	Activity	Dust Emission Magnitude		
High	Demolition	High Risk	Medium Risk	Medium Risk
	Earthworks	High Risk	Medium Risk	Low Risk
	Construction	High Risk	Medium Risk	Low Risk
	Trackout	High Risk	Medium Risk	Low Risk
Medium	Demolition	High Risk	Medium Risk	Low Risk
	Earthworks	Medium Risk	Medium Risk	Low Risk
	Construction	Medium Risk	Medium Risk	Low Risk
	Trackout	Medium Risk	Low Risk	Negligible
Low	Demolition	Medium Risk	Low Risk	Negligible
	Earthworks	Low Risk	Low Risk	Negligible
	Construction	Low Risk	Low Risk	Negligible
	Trackout	Low Risk	Low Risk	Negligible

The IAQM guidelines identify a range of mitigation measures intended to reduce the emission and effects of dust from construction sites, and identify their likely applicability to a development based on the level of impact risk attributed. Consideration is given to these in the development of mitigation measures, with the significance of the residual effect based on professional judgement.

3.3. Operational Phase

3.3.1. Road Traffic Emissions

Road traffic is the main source of local pollution with respect to NO₂, PM₁₀ and PM_{2.5}. Following consultation with Ashley Helme Associates it has been confirmed that the development-generated road traffic exceeds the thresholds detailed in the IAQM & EPUK Air Quality Guidance (+/- 100 AADT for LGV and or +/-25 AADT for HDV's - See Table 3.7). As such a detailed assessment of operational phase impacts has been undertaken.

Table 3.7 *Development Generated Road Traffic per link*

Road Link	Development Generated Road Traffic
Downley Drive	56
St Vincent's Street	188
Woodward Street	56
Weybridge Street	244
Old Mill Street	108
Great Ancoats NW	24
Great Ancoats SE	52

To consider the impact on NO₂, PM₁₀ and PM_{2.5} concentrations at the specified receptors locations a detailed assessment of has been undertaken using the air dispersion model ADMS-Roads, Version 5 (release date 16th March 2020). This model uses detailed road traffic information, surface roughness, and local meteorological information to predict the impact on pollutant concentrations at specific receptor points. Table 3.8 summarises the air quality modelling parameters for road traffic.

Table 3.8 ADMS Roads Modelling Parameters

Parameter	Local Area	Met. Measurement Site
Latitude	53.8	53.8
Surface Roughness	1	0.5
Monin-Obukhov Length (m)	30	30

The ADMS model uses meteorological data including wind speed and direction to determine the how pollution is transported and diluted with distance from the source. For this assessment, meteorological data from 2019 for Manchester has been utilised for all modelled scenarios. This meteorological site is considered representative of the Application Site and aligns with the baseline traffic data obtained from Ashley Helme Associates.

A summary of the traffic data used in the air quality assessment is presented in **Appendix B** and illustrated in **Figure 2**. **Appendix B** includes details regarding Annual Average Daily Traffic (AADT) flows, percentage of Heavy Goods Vehicles (HGV) and vehicle speeds (km/hr). For the assessment, two scenarios have been modelled:

- 2019 Baseline & Model Verification (based on available monitoring along road network provided);
- 2026 Future Baseline + Committed Developments; and,
- 2026 Future Baseline + Committed Developments + Proposed Development.

3.3.2. Vehicle Emission Factors

Vehicle emission factors for input into ADMS-Roads have been calculated using the Emission Factor Toolkit (EFT) version 10.1 (published August 2020), available on the Defra website¹³. The EFT allows for the calculation of emission factors arising from road traffic for all years between 2018 and 2030. For the predictions of future year emissions, the toolkit takes into account factors such as anticipated advances in vehicle technology and changes in fleet composition, such that vehicle emissions are assumed to reduce over time. There is good evidence from real-world testing of EURO 6 (VI) compliant vehicles of substantial improvements in vehicle emissions compared to earlier EURO categories, in particular with respect to NO_x emissions.

Defra's EFT calculator has been used to calculate the emission factors for NO_x, PM₁₀ and PM_{2.5}.

Emission factors for 2019 have been used for the baseline and model verification scenario and emission factors for 2026 have been used for the future scenarios.

3.3.3. Selection of Background Concentrations

The background concentrations of those pollutants included within the AQS and used within the air quality assessment have been mapped at a grid resolution of 1x1 km for the whole of the UK and are available on Defra's website¹⁴. Estimated background concentrations are available for all years between 2018 and 2030 and the maps assume that background concentrations will reduce (i.e. improve) over time. This assumption is based upon improvements in emissions from various sources. In line with the findings (usually based on monitoring data) of local authorities, measured concentrations have not reduced as expected over time.

For the purposes of the assessment, background concentrations from 2019 have been used in the baseline and verification scenario and background concentrations from 2026 have been utilised in the future scenarios. The background concentrations and relevant receptors used in the assessment are presented in **Appendix C**.

3.3.4. Model Verification

The ADMS-Roads dispersion model has been validated by the software developer and is considered to be fit for purpose, however local model validation, i.e. in the vicinity of the Proposed Development, has not been undertaken. Therefore, to validate the model and to determine how well the model is performing at a local level, comparing the modelling results with local monitoring data is undertaken. The verification process aims to minimise model uncertainty and error by adjusting the modelled results by a factor to offer greater confidence in the final results. This is undertaken in accordance with the methodology specified in Chapter 7, Section 4, of LAQM.TG16.

Details of the verification factor calculations are presented in **Appendix D** and illustrated on **Figure 3**. An adjustment factor of **1.1** was obtained during the verification process, which indicated that the model was under-predicting. This factor was applied to the modelled road-NO_x outputs prior to conversion to annual mean NO₂ concentrations utilising the NO_x to NO₂ calculator (version 8.1, released August 2020) provided by Defra¹⁵.

No local monitoring data was available for PM₁₀ and PM_{2.5}, therefore the adjustment factor calculated for NO_x has been applied to both the modelled PM₁₀ and PM_{2.5} concentrations prior to adding to the appropriate background concentration. This approach is in accordance with LAQM.TG16.

3.3.5. Significance Criteria

For the construction phase, IAQM guidance has been used to determine the impact, the mitigation and the significance of effects (refer to Section 3.2).

For the operational phase the EPUK and IAQM guidance document has been followed for establishing the significance of air quality impacts arising as a result of the Proposed Development. The magnitude of impact on individual receptors is dependent upon the long-term average pollutant concentrations at the receptor in the assessment year and the percentage change relative to the Air Quality Assessment Level (AQAL), as identified in Table 3.9.

Table 3.9 *Impact Descriptors*

Long-term Average Concentration at Receptor in Assessment Year	Percentage Change in Concentration to AQAL*			
	1	2 – 5	6 – 10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

* Where the % change is <0.5%, the change is described as 'Negligible' regardless of concentration

The guidelines, however, do not provide a set method for establishing the significance of impact. Whilst the establishment of the impact magnitude on individual receptors can be identified as negligible, slight, moderate or substantial, the significance of the overall effect is dependent on a number of factors. Therefore, professional judgement will be applied to determine the likely significance of effects, with the following factors considered:

- The existing and future air quality in the absence of the development, notably whether the Air Quality Objectives are likely to be met or the scale of exceedances in the long-term and short-term concentrations;

- The extent of current and future population exposure to the impacts, notably the number of properties and/or people present and the scale of impact (e.g. whether the majority of the local population is subject to substantial or slight magnitude impacts);
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts, such as establishing a worst-case scenario for sensitive receptors.

3.4. Limitations & Assumptions

Professional judgement has been used in the completion of the construction phase dust assessment for the Proposed Development.

It is assumed that the traffic data provided by Ashley Helme Associates is accurate and robust for input into the dispersion modelling.

The road traffic data provided for St Vincent Street is estimated using TRICS trip rates for the 114 apartments and 13 houses located on this road. This approach had to be adopted in the absence of localised traffic collection. The TRICS trip rates that are used to estimate the traffic on St Vincent Street are those that are adopted in the Transport Statement.

The ADMS Roads dispersion models have been used in this assessment to assess the existing and future baseline concentrations in the vicinity of the Application Site. The dispersion model relies on input data, such as traffic data and predicted emissions data, etc., which may have uncertainties associated with them. The models simplify complex environments and does not always accurately reflect local micro-climatic conditions which may ultimately affect the predicted pollutant concentrations.

It is assumed that the information provided by the M&E engineers and the energy consultant noting the exclusion of onsite combustion plant are accurate.

It should be noted that the Defra Toolkits including the background maps, the EFT and NO_x to NO₂ calculator are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence the tools do not reflect short or longer term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

The Defra background concentrations indicate air quality conditions at ground level. These ground level concentrations have been applied to all receptors, including those at height. As a result, the concentrations are likely to be lower at the receptors at height than predicted, but the assessment presents the worst case scenario and is therefore appropriate.

The assumptions made in the assessment are considered reasonable and robust.

4. Baseline Conditions

4.1. Local Air Quality Information

The Greater Manchester Combined Authority (GMCA) have declared an AQMA, which covers Manchester City Centre and extends along the main arterial traffic routes in the city and around Manchester Airport. The pollutant declared for the AQMA is annual mean NO₂, with the source identified as a mixture of road types. The extent of the AQMA in relation to the Application Site is identified in **Figure 4** – the site is not located within an existing AQMA, but roads which may be utilised by development generated road traffic are located inside the AQMA.

4.1.1. Defra Background Concentrations

The Defra background concentrations for NO₂, PM₁₀ and PM_{2.5} for the 1x1km grid square (385500, 398500) in which the Proposed Development is located are presented in Table 4.1 below.

Table 4.1 Defra Background Concentrations (µg/m³)

Pollutant	2019	2026
NO ₂	23.4	18.7
PM ₁₀	12.6	11.7
PM _{2.5}	11.3	7.7
*Bold indicates an exceedance of the relevant AQS objective.		

The Defra background concentrations for NO₂, PM₁₀ and PM_{2.5} for 2019 are below the relevant AQS objectives (40µg/m³ for NO₂ and PM₁₀, and 25µg/m³ for PM_{2.5}).

4.1.2. Local Air Quality Monitoring Data

As part of the Greater Manchester Air Quality Action Plan, a number of automated and non-automated air quality monitoring stations have been set up. Two continuous automated monitoring stations are located in the vicinity of Manchester City Centre, as identified in Table 4.2, with one non-automated monitoring locations in the vicinity of the Proposed Development.

4.1.2.1. Nitrogen Dioxide

The annual mean NO₂ concentrations are identified in Table 4.2 for the air quality monitoring locations located in close proximity to the Application Site.

Automated survey results from the Oxford Road and Piccadilly demonstrate exceedances of the annual mean between 2015 and 2019, with the exception of Piccadilly in 2015 and 2017-2019.

The results from the most representative non-automated monitoring sites (Great Ancoats Street) indicated annual mean concentrations that exceed the AQS objective between 2019. These monitoring locations are located within the existing AQMA, and therefore concentrations would expected to be elevated. Comparatively, we would expect concentrations at the Application Site to be lower than those indicated in Table 4.2.

Table 4.2 NO₂ Monitoring – Annual Mean Concentrations (µg/m³)

Monitoring Site	X, Y	Type	Annual Mean Concentration (µg/m ³)				
			2015	2016	2017	2018	2019
Oxford Road	384233, 397287	Roadside	66	66	65	62	59

Monitoring Site	X, Y	Type	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)				
			2015	2016	2017	2018	2019
Piccadilly	384310, 398337	Urban Background	39	40	36	35	36
Great Ancoats Street	385151, 398290	Roadside	-	-	-	-	45.3
*Bold indicates an exceedance of the relevant AQS objective.							

4.1.2.2. Particulate Matter (PM_{10} & $\text{PM}_{2.5}$)

The annual mean PM_{10} and $\text{PM}_{2.5}$ concentrations are identified in Table 4.3 for the air quality monitoring locations located in close proximity to the Site.

Automated survey results from the Oxford Road and Piccadilly demonstrate compliance with the annual mean objectives (40 and $25\mu\text{g}/\text{m}^3$) between 2015 and 2019. These monitoring locations are located within the existing AQMA, and therefore concentrations at the Application Site are anticipated to be lower than those indicated in Table 4.3.

Table 4.3 *PM_{10} & $\text{PM}_{2.5}$ Monitoring – Annual Mean Concentrations ($\mu\text{g}/\text{m}^3$)*

Monitoring Site	X, Y	Type	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) (PM_{10})				
			2015	2016	2017	2018	2019
Oxford Road	384233, 397287	Roadside	28	27	27	30	26
Piccadilly	384310, 398337	Urban Background	20	20	20	21	20
$\text{PM}_{2.5}$							
Piccadilly	384310, 398337	Urban Background	10	10	8	11	12
*Bold indicates an exceedance of the relevant AQS objective.							

4.2. Sensitive Receptors

Defra provides guidance on locations where the air quality objectives should apply and Table 4.4 and professional judgement have been used to select receptors where likely significant exposure to pollutant concentrations may occur.

Table 4.4 *Examples of where the Air Quality Objective may or may not apply*

Averaging Period	Objectives Should Apply	Objectives Should Generally Not Apply
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence.

Averaging Period	Objectives Should Apply	Objectives Should Generally Not Apply
		Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other locations where public exposure is expected to be short-term.
24-Hour Mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other locations where public exposure is expected to be short-term.
1-Hour Mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend 1 hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-Minute Mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

The receptor locations were selected where the greatest impact from the Proposed Development may be felt and based up on where traffic information was made available. It is noted that there are other sensitive receptors in the locale including a number of primary schools, however traffic data was not available for the roads in which these receptors are located. Furthermore, all receptors selected are considered to be highly sensitive as they residential in nature. These locations are detailed in **Appendix C** and illustrated on **Figure 5**, at the end of this report.

5. Effects Appraisal and Site Suitability

5.1. Construction

5.1.1. Assessment of Potential Dust Emission Magnitude

The likely magnitude of dust emissions from the Proposed Development for the four main activities has been assessed, as identified in Table 5.1.

Table 5.1 Predicted Magnitude of Dust Emissions from Proposed Development

Activity	Magnitude	Justification
Demolition	N/A	At this stage it is understood that no demolition on the Application is proposed.
Earthworks	Medium	The site area is estimated 6,900m ² . The soil type is potentially dusty. There is likely to be excavation works with the total material to be moved estimated to be 20,000-100,000 tonnes. At this stage the number of heavy earth moving vehicles has not be confirmed, but it is estimated to be between 5 and 10 based up on the site locale. Based up on the above the Site has been classified as Medium.
Construction	Medium	The total building volume is estimated to fall between 25,000-100,000m ³ based up on the floor area and height which corresponds in the IAQM Guidance as Medium threshold. The material to be used in the construction stage includes steel and brick/masonry products – the dust release potential is Medium.
Trackout	Medium	Given the size of the site, the proposed haul roads are expected to be no more than 100m in length. These roads are expected to be unpaved, therefore there is potential for dust releases. It is estimated that there would be 10-50 movements per day.

5.1.2. Sensitivity of the Area

A wind rose for Manchester 2019 is provided in **Appendix E** and this indicates that the prevailing wind direction is from the south-west. Therefore, existing receptors that are located to the north and east are most likely to fall within the area of influence from dust emissions generated by the construction phase.

The majority of dust generated by the construction phase is likely to be deposited in close proximity to the source (see **Figure 6**). Surrounding the Application Site there are a number of highly sensitive existing residential receptors (10-100 within 20m). There are no ecological receptors located within 50m of the Application Site, or within 500m of the likely construction traffic route and therefore consideration of these receptors has been scoped out.

The Defra background PM₁₀ concentration is 12.6µg/m³ in 2019 which is well below the annual mean air quality objective.

The sensitivity of the area to each of the previously identified impact types associated with the Proposed Development are identified in Table 5.2.

Table 5.2 *Sensitivity of Receptors to Dust Emission Effects*

Impact Type	Sensitivity of Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	High	High	High
Human Health	N/A	Low	Low	Low
Ecological	N/A	N/A	N/A	N/A

To determine the risk of impacts prior to the implementation of mitigation the dust emission magnitude and the sensitivity of the area have been combined. Table 5.3 below summaries the potential risk of impacts during the construction phase.

Table 5.3 *Risk of Dust Related Impacts from the Proposed Development*

Impact Type	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium Risk	Medium Risk	Medium Risk
Human Health	N/A	Low Risk	Low Risk	Low Risk
Ecological	N/A	N/A	N/A	N/A

The risk of dust related impacts from the Proposed Development on existing receptors in the vicinity of the Application Site is Medium Risk for dust soiling and Low Risk to Negligible for human health without the implementation of mitigation.

5.1.3. Construction Road Traffic & Non-Road Mobile Machinery (NRMM)

The greatest impact on air quality due to construction traffic and NRMM is likely to be along roads in the vicinity of the Application Site. It is likely that construction traffic will enter the Application Site via Downley Drive and Woodward Street. It is likely that the volume of construction traffic will be low compared to the existing traffic flows.

Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, the impacts are therefore considered to be slight adverse without the implementation of mitigation.

5.2. Operational Phase

A full breakdown of the detailed dispersion modelling results is presented in **Appendix F**, however a summary is provided below.

5.2.1. Annual Mean NO₂ Concentrations

The objective for annual mean NO₂ concentrations is 40 µg/m³.

‘Without’ and ‘with’ the Proposed Development operational, the annual mean NO₂ concentrations at all existing receptors are below the AQS Objective. The highest predicted concentration with the Proposed Development operational is 30.1 µg/m³ at existing receptor E1.

The greatest predicted change in annual mean NO₂ brought about by development generated road traffic is 0.1 µg/m³ at a various existing receptors. According to the EPUK/IAQM guidance, the impacts on annual mean NO₂ concentrations at existing receptors are negligible.

With the Proposed Development operational, annual mean NO₂ concentrations at all modelled proposed receptors were below the AQS objective - the highest concentration is 23.7 µg/m³ at N1 and N8.

On this basis, mitigation to protect future users of the Proposed Development from elevated annual mean NO₂ concentrations is not required.

5.2.2. Hourly Mean NO₂ Concentrations

To determine compliance with the 1-hour mean objective for NO₂, detailed modelling has been undertaken to compare total concentrations against the relevant AQS objective – 200 µg/m³.

With the Development operational, short-term NO₂ concentrations at all existing receptors are predicted to be below the AQS objective. The highest predicted concentration with the operation of the Proposed Development is 54.8 µg/m³. The impacts of the Development on hourly mean NO₂ concentrations are negligible, therefore mitigation is not required.

All the new receptors would experience concentrations below the short-term AQS objective, with the highest predicted concentration being 38.7 µg/m³ at N8.

5.2.3. Annual Mean PM₁₀ Concentrations

The objective for annual mean PM₁₀ concentrations is 40 µg/m³.

‘Without’ and ‘with’ the Proposed Development operational, the annual mean PM₁₀ concentrations at all existing receptors are below the AQS Objective. The highest predicted concentration with the Proposed Development operational is 14.9 µg/m³ at existing receptor E1.

There is no predicted change in annual mean PM₁₀ brought about by development generated road traffic is at any of the modelled existing receptors. According to the EPUK/IAQM guidance, the impacts on annual mean PM₁₀ concentrations at existing receptors are negligible.

With the Proposed Development operational, annual mean PM₁₀ concentrations at all modelled proposed receptors were below the AQS objective - the highest concentration is 12.6 µg/m³ at all new receptors modelled.

On this basis, mitigation to protect future users of the Proposed Development from elevated annual mean PM₁₀ concentrations is not required.

5.2.4. Daily Mean PM₁₀ Concentrations

The AQS objective for daily mean PM₁₀ concentrations is 50 µg/m³, to be exceeded no more than 35 times a year.

The assessment demonstrates that all existing receptors fall within the daily mean PM₁₀ objective with a maximum of 1 exceedance predicted in both the ‘without’ and ‘with’ Development scenarios. Furthermore, there are no differences between the ‘without’ and ‘with’ development scenarios. As a result, the impact on daily mean PM₁₀ concentrations are negligible.

For daily mean PM₁₀, it is predicted that all new receptors would be well within the AQS objective, again with a maximum of 1 predicted exceedances of the limit at a number of receptors.

5.2.5. Annual Mean PM_{2.5} Concentrations

The objective for annual mean PM_{2.5} concentrations is 25 µg/m³.

‘Without’ and ‘with’ the Proposed Development operational, the annual mean PM_{2.5} concentrations at all existing receptors are below the AQS Objective. The highest predicted concentration with the Proposed Development operational is 9.6 µg/m³ at existing receptor E1.

There greatest predicted change in annual mean $PM_{2.5}$ brought about by development generated road traffic is $0.1 \mu\text{g}/\text{m}^3$ at a various existing receptors. According to the EPUK/IAQM guidance, the impacts on annual mean $PM_{2.5}$ concentrations at existing receptors are negligible.

With the Proposed Development operational, annual mean $PM_{2.5}$ concentrations at all modelled proposed receptors were below the AQS objective - the highest concentration is $8.4 \mu\text{g}/\text{m}^3$ at N1 and N8.

On this basis, mitigation to protect future users of the Proposed Development from elevated annual mean $PM_{2.5}$ concentrations is not required.

6. Mitigation

6.1. Construction Phase

The IAQM guidelines provide an indication of the mitigation measures that would be appropriate for inclusion within the Proposed Development, based on the level of risk of dust related impacts identified for each of the activities. Consequently, the following mitigation measures should be incorporated into the Proposed Development, and delivered through the implementation of a Construction Environment Management Plan (CEMP).

Mitigation measures that are generic to each of the activities, and therefore should be implemented for the duration of the construction related works where applicable are identified in Table 6.1, whilst activity specific mitigation measures are identified in Table 6.2.

Table 6.1 Mitigation to be implemented during the Construction Phase

Development Element	Mitigation Measure
Communication	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. Display the head or regional office contact information.
Planning	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the measures recommended in this table.
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 emissions, either on- or off- site, and the action taken to resolve the situation in the log book.
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning provided if necessary. Carry out regular site inspections to monitor compliance with the DMP, 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.

Development Element	Mitigation Measure
Preparing and Maintaining the Site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. Avoid site run-off of water or mud. Keep site fencing, barriers and scaffolding clean using wet methods. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. Cover, seed or fence stockpiles to prevent wind whipping.
Operating Vehicle/ Vehicle Movements	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 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, <i>e.g.</i> suitable local exhaust ventilation systems. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. Use enclosed chutes and conveyors and covered skips. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste Management	Avoid bonfires and burning of waste materials.

Table 6.2 **Activity Specific Mitigation Measures to be implemented during the Construction Phase**

Development Element	Mitigation Measure
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Only remove the cover in small areas during work and not all at once.
Construction	Avoid scabbling (roughening of concrete surfaces) if possible. Ensure sand and other aggregates are stored in bunds in areas that 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 in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. For small supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.
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 surface 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 (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). 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.

6.1.1. Residual Effects

The residual effects of dust and PM₁₀ generated by construction activities following the application of the mitigation measures described above and good site practice is not significant.

The residual effects of emissions to air from construction vehicles and NRMM on local air quality is not significant following the implementation of the recommended mitigation measures.

6.2. Operational Phase

6.2.1. Mitigation

Based on the findings of the assessment (i.e. negligible impacts at existing receptors and no exceedances predicted of the long-term and short-term AQS objectives at new receptors), site specific is not required. As part of the proposals, a Travel Plan (TP) has been produced which includes the following measures:

- Welcome packs will be distributed to all residents. The pack will provide literature on the health benefits of walk and cycling, the environmental benefits of using sustainable travel modes and details of public transport services will be provided;
- Measures to encourage cycling and walking;
- Measures to encourage the use of public transport; and,
- Promote car sharing and car clubs.

EV charge points and infrastructure are recommended for 1 or more residential units with any parking spaces and non-residential development with any parking spaces. The EV charging recommendations for residential include:

- On-site/allocated parking: 1 EV charge point (minimum 7kW) for each dwelling.
- Unallocated parking: minimum 20% EV (minimum 7kW) charge points, and cable routes for all other spaces.

Additionally, when selecting the EV charging point and infrastructure the following considerations should be given:

- Charge point type and speed ;
- Electrical and safety standards;
- Back office functionality;
- Data security;
- Interoperability/compatibility;
- Smart charging (where appropriate);
- Load management.

Furthermore, there are a number of wider measures being considered for implementation by MCC and GMCA with the aim of improving existing air quality in the City and the Greater Manchester area, these include:

- A Greater Manchester Clean Air Zone, which the most polluting vehicles, including buses, coaches, HGV's, vans, private hire vehicles and cars would be required to pay a daily penalty;
- A funding package to support local business and aid the transition to lower emission vehicles; and,
- Increasing the number of electric vehicle charging points, which would be accessible to the public.

6.2.2. Residual Effects

The overall residual effect for the operational phase is not significant.

7. Conclusion

A qualitative assessment of construction phase impacts has been carried out. There is a medium risk of dust soiling and a low to negligible risk of fugitive PM₁₀ emissions during the construction phase. Through good site practice, the implementation of suitable mitigation measures, the impact of dust and PM₁₀ releases will be minimised. The residual effect of the construction phase on air quality is therefore not significant.

A detailed assessment of operational road traffic has been undertaken to consider the potential impact on NO₂, PM₁₀ and PM_{2.5} concentrations at existing and proposed receptor locations. The findings of the assessment indicate compliance with the annual AQS objectives for NO₂, PM₁₀ and PM_{2.5} at all modelled receptors. Furthermore, no exceedances were predicted at any of the modelled receptors with regards to the 1-hour NO₂ and 24-hour PM₁₀ AQS objectives.

Based on the findings of the assessment site specific mitigation to protect existing receptors and future users of the Proposed Development from poor air quality are not required. However, there are a number high level measures that should be incorporated into the scheme to promote sustainable travel and best practice (see Section 6.2.1).

The residual effect is not significant.

Overall, with the recommended mitigation measure in place (construction phase only as not required for the operational phase), the proposals would be compliant with legislation and policy.

Figures

Figure 1 – Site Boundary



Figure 2 – Modelled Road Network

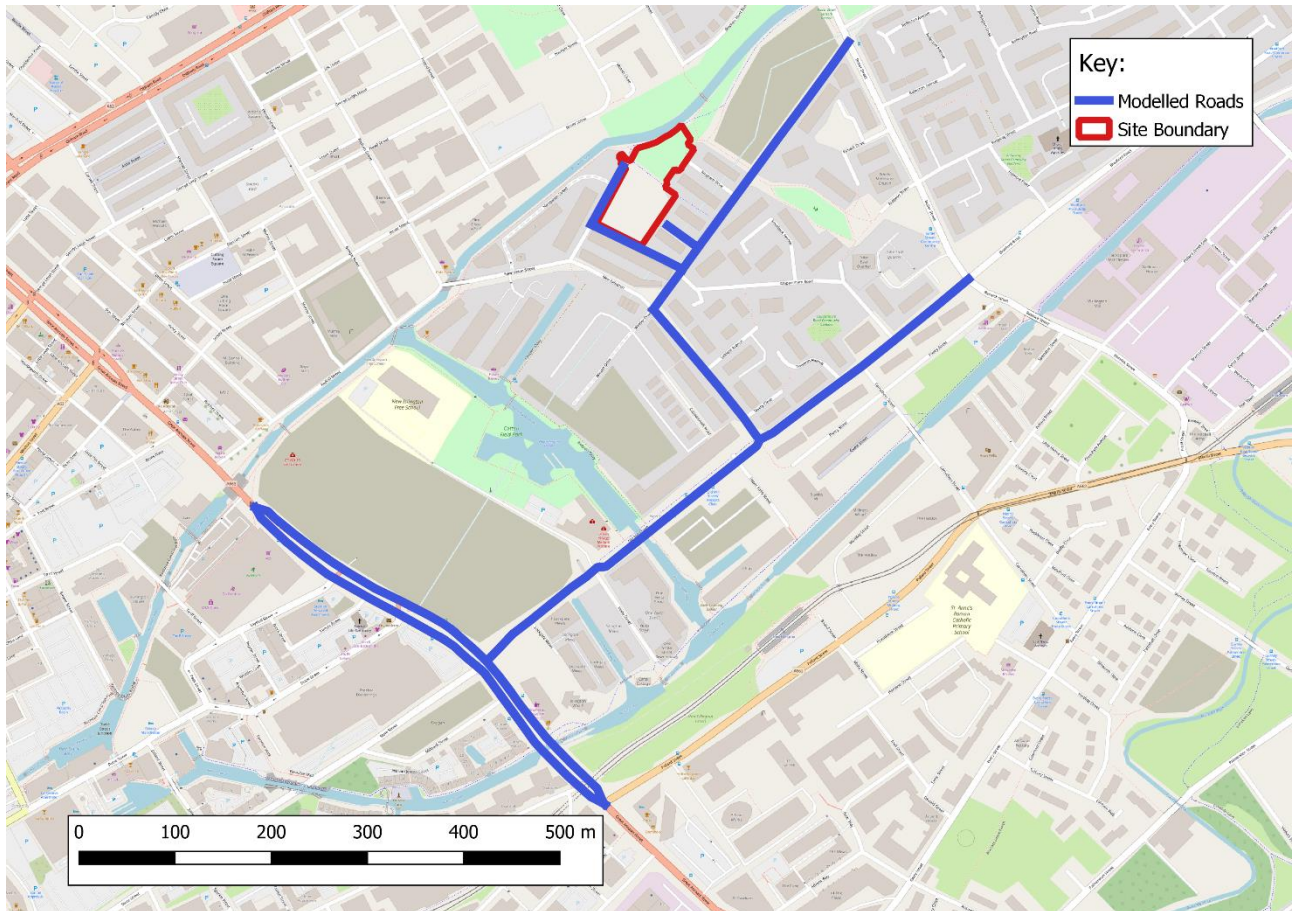


Figure 3 – Air Quality Management Area

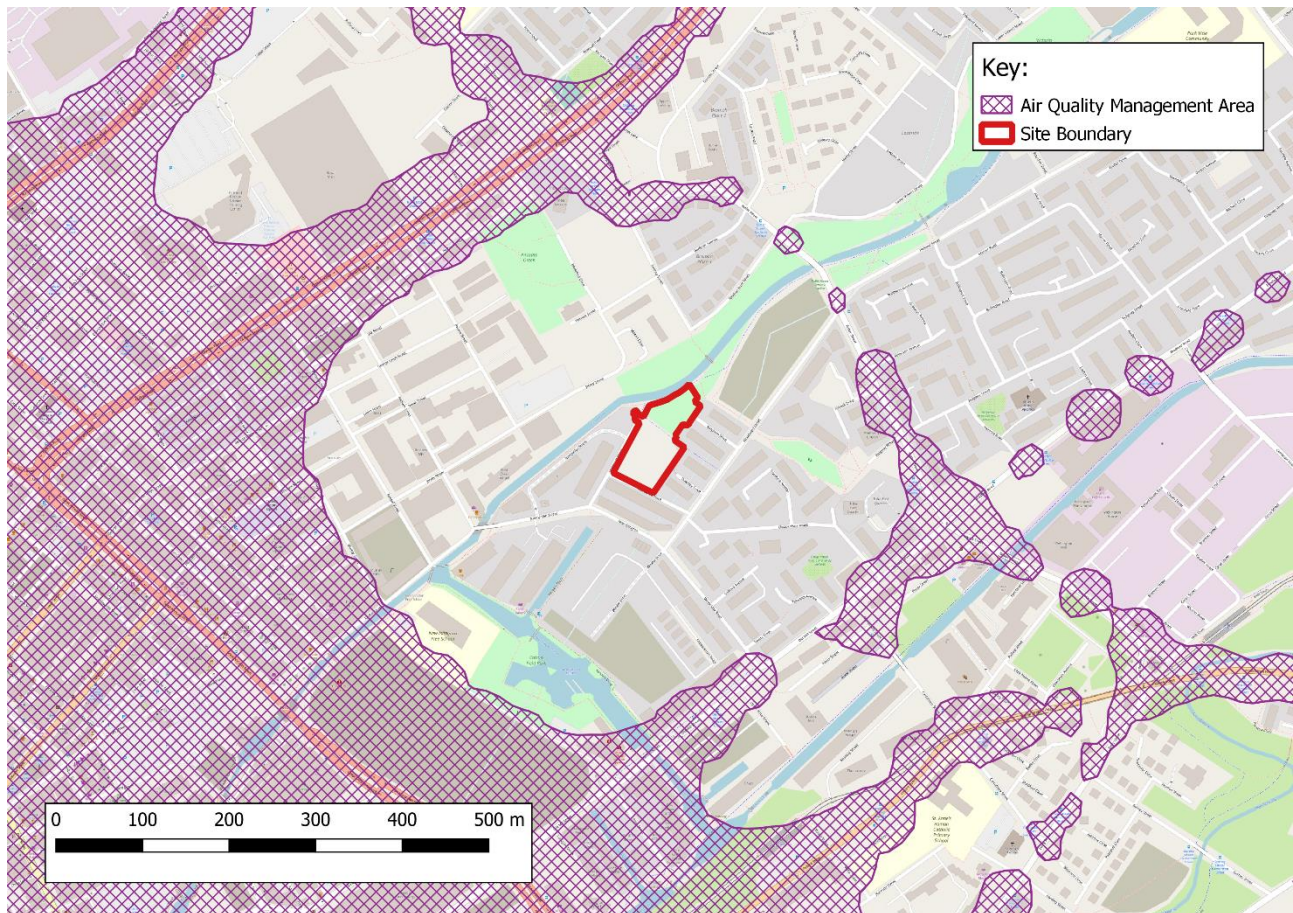


Figure 4 – Air Quality Monitoring Locations (Model Verification)

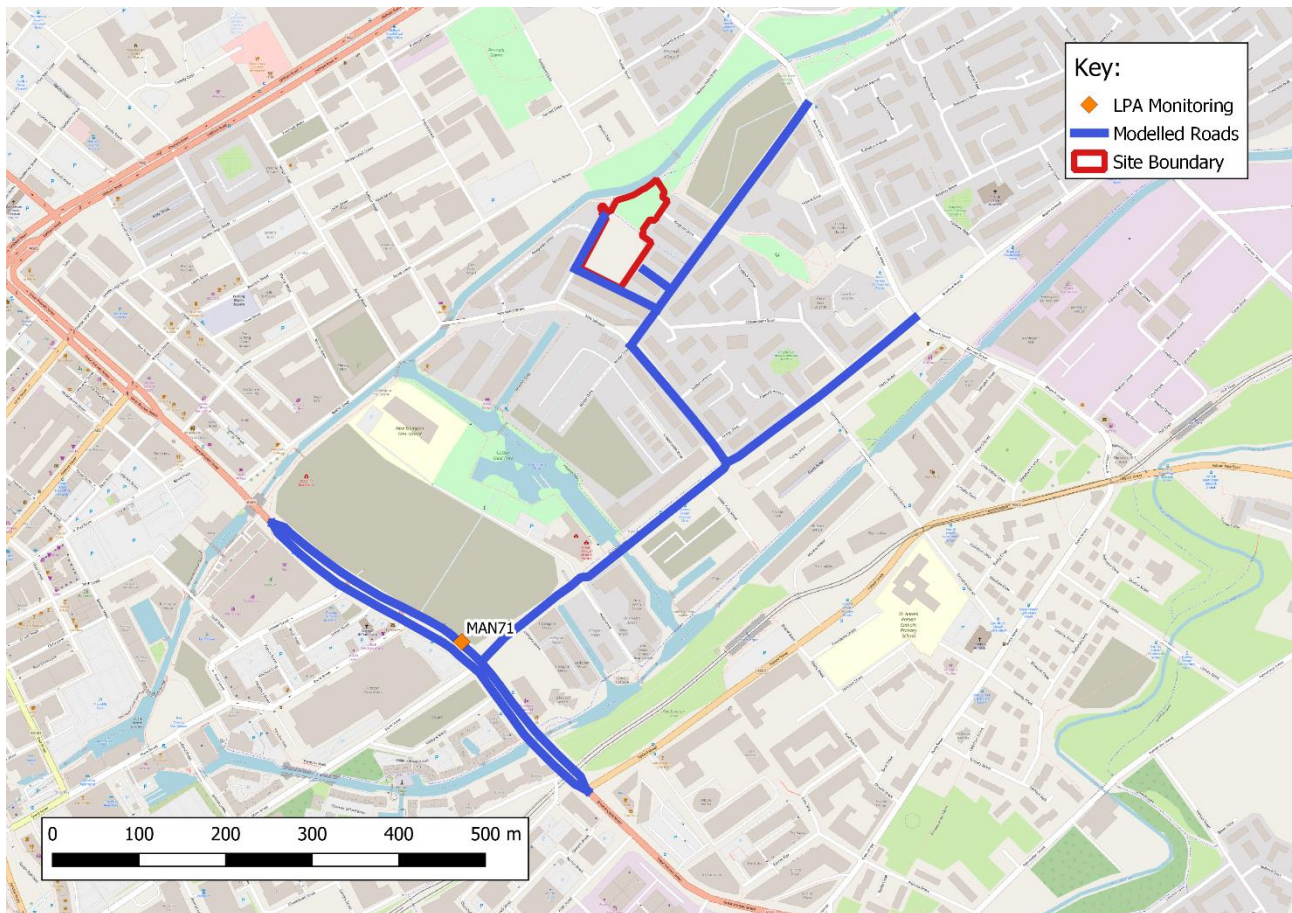


Figure 5 – Modelled Receptors

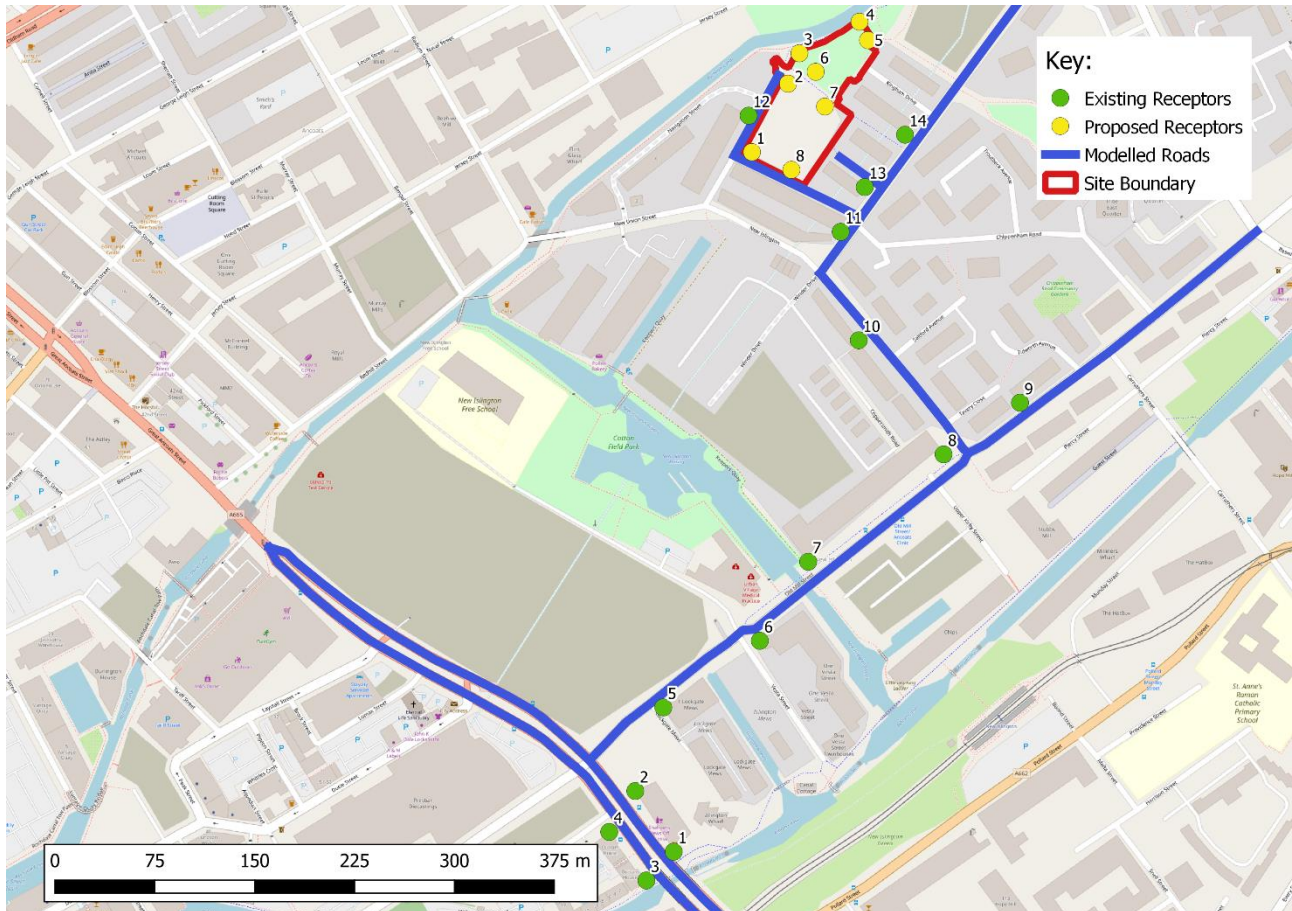
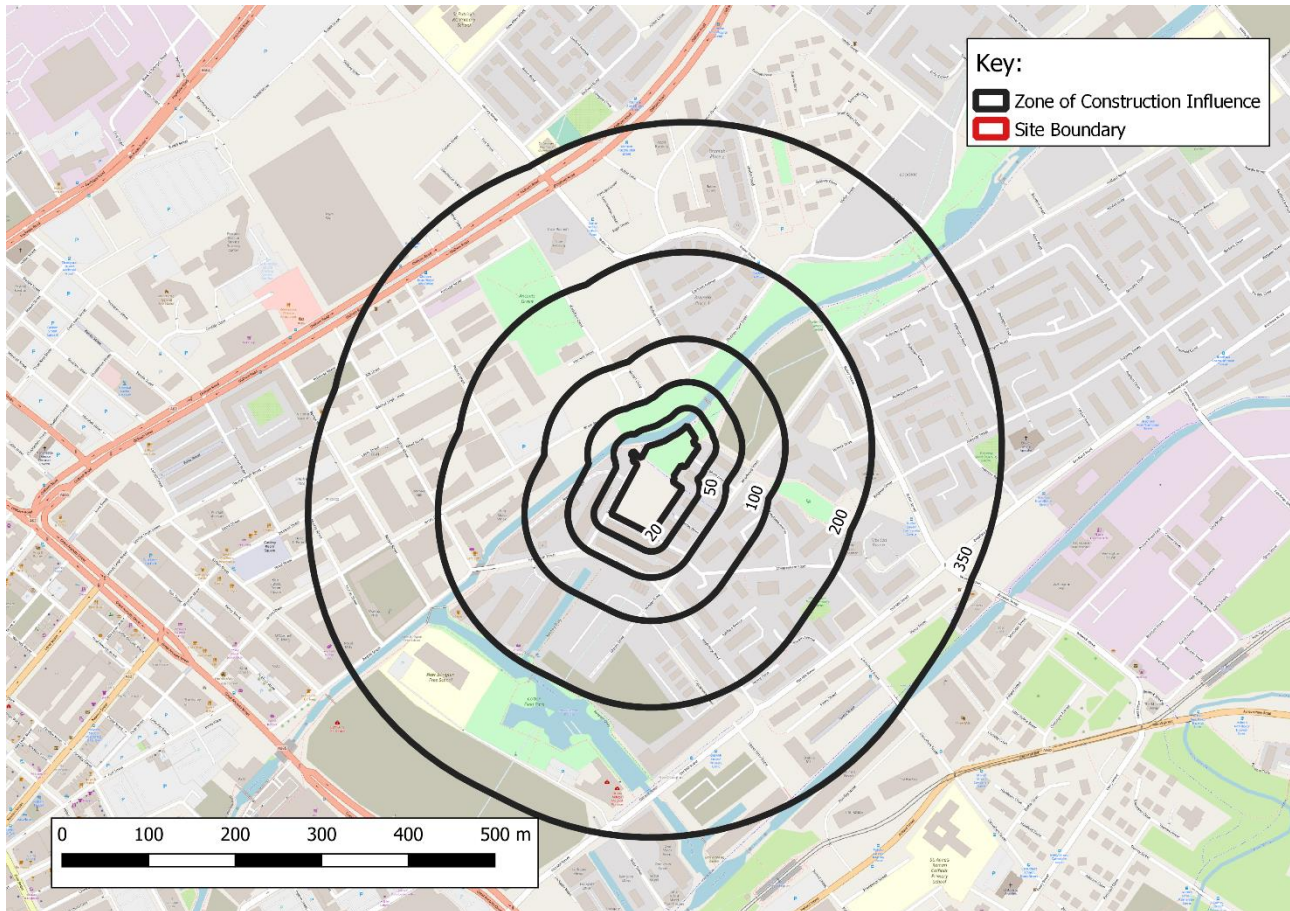


Figure 6 – Zone of Construction Influence



Appendix A Glossary

Term	Definition
AADT Annual Average Daily Traffic	A daily total traffic flow (24 hrs), expressed as a mean daily flow across all 365 days of the year.
Air Quality Objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air Quality Standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective)
Ambient Air	Outdoor air in the troposphere, excluding workplace air.
Annual Mean	The average (mean) of the concentrations measured for each pollutant for one year.
AQMA	Air Quality Management Area
Conservative	Tending to over-predict the impact rather than under-predict.
Data Capture	The percentage of all the possible measurements for a given period that were validly measured.
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport.
Dust	Dust comprises particles typically in the size range 1-75 micrometres (µm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials.
Exceedance	A period of time where the concentrations of a pollutant is greater than the appropriate air quality standard.
HDV/HGV	Heavy Duty Vehicle/Heavy Goods Vehicle
LAQM	Local Air Quality Management
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10 micrometres (µm)
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres (µm)
Trackout	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 heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDV's transfer dust and dirt onto the road having travelled over muddy ground on site.



Appendix B Traffic Data

ID	Canyon	Width	Speed	2019 Baseline					2026 Without Development					2026 With Development				
				AADT	AAHT	HGV %	HGV AADT	HGV AAHT	AADT	AAHT	HGV %	HGV AADT	HGV AAHT	AADT	AAHT	HGV %	HGV AADT	HGV AAHT
1	No	7	32	2282	95	4.1	94	4	2629	110	4.1	108	4	2737	114	4.1	112	5
2	No	12.5	16	2282	95	4.1	94	4	2629	110	4.1	108	4	2737	114	4.1	112	5
3	No	7	16	17421	726	2.1	366	15	19518	813	2.1	410	17	19544	814	2.1	410	17
4	No	10.5	32	17421	726	2.1	366	15	19518	813	2.1	410	17	19544	814	2.1	410	17
5	No	7	32	17421	726	2.1	366	15	19518	813	2.1	410	17	19544	814	2.1	410	17
6	No	10.5	16	17421	726	2.1	366	15	19518	813	2.1	410	17	19544	814	2.1	410	17
7	No	7	16	15632	651	3.4	531	22	17457	727	3.4	594	25	17469	728	3.4	594	25
8	No	10.5	32	15632	651	3.4	531	22	17457	727	3.4	594	25	17469	728	3.4	594	25
9	No	7	32	15632	651	3.4	531	22	17457	727	3.4	594	25	17469	728	3.4	594	25
10	No	10.5	16	15632	651	3.4	531	22	17457	727	3.4	594	25	17469	728	3.4	594	25
11	No	10	32	2282	95	4.1	94	4	2629	110	4.1	108	4	2737	114	4.1	112	5
12	Yes - 30	25	32	2282	95	4.1	94	4	2629	110	4.1	108	4	2737	114	4.1	112	5
13	No	13	32	2282	95	4.1	94	4	2629	110	4.1	108	4	2737	114	4.1	112	5
14	No	6	16	78	3	1.2	1	0	87	4	1.2	1	0	143	6	1.2	2	0
15	No	7	16	75	3	6.8	5	0	83	3	6.8	6	0	139	6	6.8	9	0
16	No	6	16	230	10	1.2	3	0	256	11	1.2	3	0	444	19	1.2	5	0
17	No	6	16	230	10	1.2	3	0	256	11	1.2	3	0	444	19	1.2	5	0
18	No	6	16	492	21	3.6	18	1	546	23	3.6	20	1	790	33	3.6	28	1

Appendix C Modelled Receptors & Background Concentrations

Receptor ID	X	Y	2019			2026		
			NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
E1	385265	398181	23.4	12.6	8.3	18.7	11.7	7.7
E2	385236	398226	23.4	12.6	8.3	18.7	11.7	7.7
E3	385244	398159	23.4	12.6	8.3	18.7	11.7	7.7
E4	385216	398196	23.4	12.6	8.3	18.7	11.7	7.7
E5	385257	398289	23.4	12.6	8.3	18.7	11.7	7.7
E6	385329	398339	23.4	12.6	8.3	18.7	11.7	7.7
E7	385365	398398	23.4	12.6	8.3	18.7	11.7	7.7
E8	385467	398479	23.4	12.6	8.3	18.7	11.7	7.7
E9	385524	398518	23.4	12.6	8.3	18.7	11.7	7.7
E10	385403	398564	23.4	12.6	8.3	18.7	11.7	7.7
E11	385390	398646	23.4	12.6	8.3	18.7	11.7	7.7
E12	385321	398733	23.4	12.6	8.3	18.7	11.7	7.7
E13	385408	398679	23.4	12.6	8.3	18.7	11.7	7.7
E14	385438	398719	23.4	12.6	8.3	18.7	11.7	7.7
N1	385323	398706	23.4	12.6	8.3	18.7	11.7	7.7
N2	385350	398757	23.4	12.6	8.3	18.7	11.7	7.7
N3	385359	398780	23.4	12.6	8.3	18.7	11.7	7.7
N4	385404	398803	23.4	12.6	8.3	18.7	11.7	7.7
N5	385410	398790	23.4	12.6	8.3	18.7	11.7	7.7
N6	385371	398766	23.4	12.6	8.3	18.7	11.7	7.7
N7	385378	398740	23.4	12.6	8.3	18.7	11.7	7.7
N8	385353	398692	23.4	12.6	8.3	18.7	11.7	7.7

Appendix D Model Verification

The comparison of modelled concentrations with local monitored concentrations is a process termed 'verification'. Model verification investigates the discrepancies between modelled and measured concentrations. Discrepancies occur due to model uncertainties, such as:

- Estimates of background pollutant concentrations;
- Meteorological data uncertainties;
- Traffic data uncertainties;
- Model input parameters; and
- Overall limitations of the dispersion model.

NO₂ is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. Therefore model verification for nitrogen oxides (NO_x = NO + NO₂) the primary pollutant is appropriate. This has been undertaken in accordance Chapter 7 of LAQM.TG(16).

The model has been run to predict the 2019 annual mean road-NO_x contribution at the monitoring locations given below. The model outputs of road-NO_x for each location have been compared with the 2018 'measured' road-NO_x, which was determined utilising the NO_x from NO₂ calculator and the NO₂ concentration data from MCC monitoring.

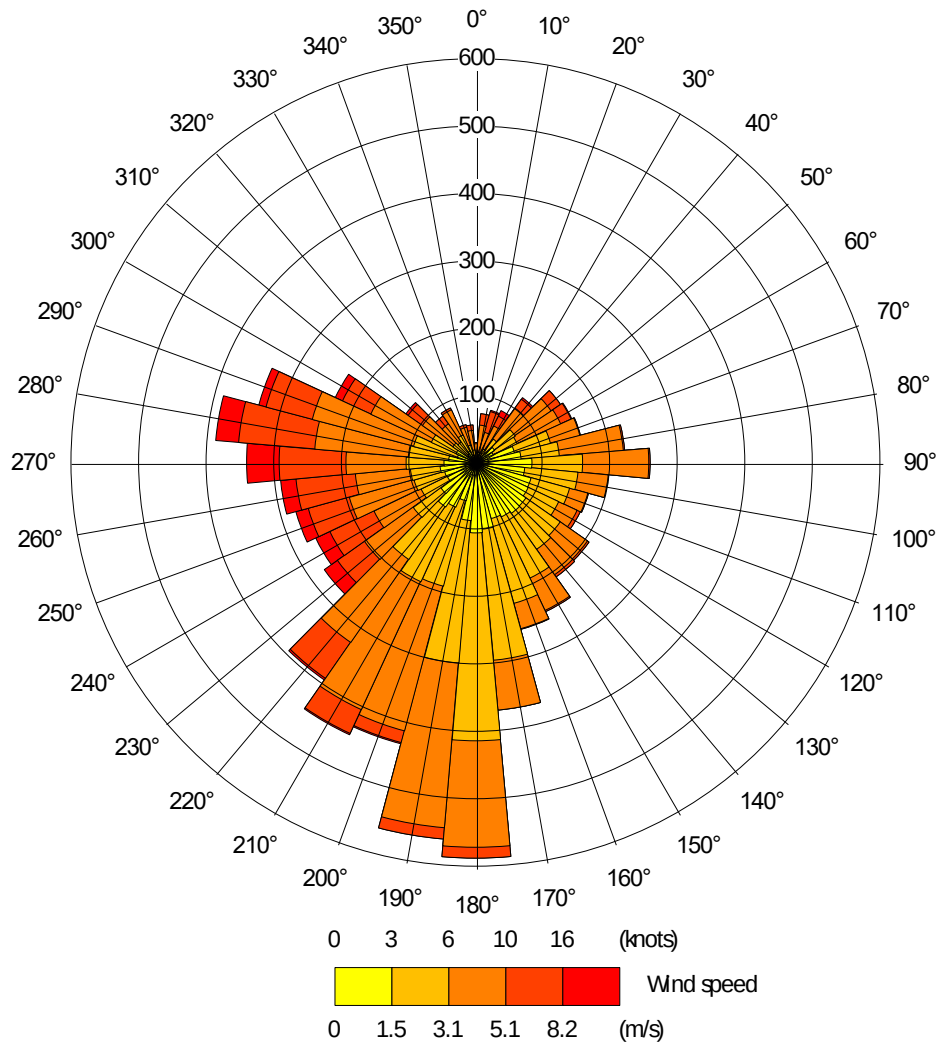
Details of the data used in the verification process is in the table and figure below.

ID	2019 Monitored Total NO ₂ (µg/m ³)	Background NO ₂ (µg/m ³)	2019 Monitored Road Contribution NO _x (µg/m ³)	2019 Modelled Road Contribution NO _x (µg/m ³)	Ratio of monitored NO _x road contribution/modelled road contribution NO _x
MAN 71	45.3	23.4	46.1	42	1.1

The adjustment factor calculated is 1.1.

For PM₁₀ and PM_{2.5} there are no relevant local monitoring data against which the model could be verified. Consequently, the verification factors determined above for adjusting the road-NO_x contribution has been applied to the predicted road-PM₁₀ and road-PM_{2.5} contributions, consistent with guidance set out in LAQM.TG(16).

Appendix E 2019 Manchester Wind Rose



Appendix F Modelled Results

Annual Mean NO₂ Results

Receptor ID	Without Development (µg/m ³)	With Development (µg/m ³)	Change (µg/m ³)	% Change Relative to Objective	Impact/ Exceed
E1	30.1	30.1	0.0	0.0	Negligible
E2	29.0	29.0	0.0	0.0	Negligible
E3	26.5	26.5	0.0	0.0	Negligible
E4	26.8	26.8	0.0	0.0	Negligible
E5	25.1	25.1	0.0	0.0	Negligible
E6	24.1	24.1	0.0	0.0	Negligible
E7	24.2	24.2	0.0	0.0	Negligible
E8	24.0	24.1	0.1	0.0	Negligible
E9	24.1	24.1	0.0	0.0	Negligible
E10	23.7	23.7	0.0	0.0	Negligible
E11	23.6	23.7	0.1	0.0	Negligible
E12	23.6	23.7	0.1	0.0	Negligible
E13	23.6	23.6	0.0	0.0	Negligible
E14	23.6	23.6	0.0	0.0	Negligible
N1	-	23.7	-	-	No
N2	-	23.6	-	-	No
N3	-	23.6	-	-	No
N4	-	23.5	-	-	No
N5	-	23.5	-	-	No
N6	-	23.6	-	-	No
N7	-	23.6	-	-	No
N8	-	23.7	-	-	No

1-Hour Mean NO₂ Results

Receptor ID	Without Development (µg/m ³)	With Development (µg/m ³)	Change (µg/m ³)	Impact/ Exceed
E1	54.5	54.5	0.0	Negligible
E2	54.8	54.8	0.0	Negligible
E3	51.8	51.8	0.0	Negligible
E4	52.0	52.1	0.0	Negligible
E5	43.9	44.0	0.1	Negligible
E6	40.8	40.9	0.0	Negligible
E7	40.2	40.2	0.0	Negligible
E8	39.5	39.6	0.0	Negligible
E9	39.7	39.8	0.1	Negligible
E10	38.6	38.6	0.0	Negligible
E11	38.5	38.6	0.1	Negligible
E12	38.5	38.7	0.2	Negligible
E13	38.5	38.6	0.1	Negligible
E14	38.3	38.4	0.1	Negligible

Receptor ID	Without Development ($\mu\text{g}/\text{m}^3$)	With Development ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	Impact/ Exceed
N1	-	38.7	-	No
N2	-	38.4	-	No
N3	-	38.4	-	No
N4	-	38.2	-	No
N5	-	38.2	-	No
N6	-	38.3	-	No
N7	-	38.3	-	No
N8	-	38.7	-	No

Annual Mean PM₁₀ Results

Receptor ID	Without Development ($\mu\text{g}/\text{m}^3$)	With Development ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	% Change Relative to Objective	Impact/ Exceed
E1	14.9	14.9	0.0	0.0	Negligible
E2	14.4	14.4	0.0	0.0	Negligible
E3	13.6	13.6	0.0	0.0	Negligible
E4	13.7	13.7	0.0	0.0	Negligible
E5	13.1	13.1	0.0	0.0	Negligible
E6	12.8	12.8	0.0	0.0	Negligible
E7	12.8	12.8	0.0	0.0	Negligible
E8	12.8	12.8	0.0	0.0	Negligible
E9	12.8	12.8	0.0	0.0	Negligible
E10	12.6	12.6	0.0	0.0	Negligible
E11	12.6	12.6	0.0	0.0	Negligible
E12	12.6	12.6	0.0	0.0	Negligible
E13	12.6	12.6	0.0	0.0	Negligible
E14	12.6	12.6	0.0	0.0	Negligible
N1	-	12.6	-	-	No
N2	-	12.6	-	-	No
N3	-	12.6	-	-	No
N4	-	12.6	-	-	No
N5	-	12.6	-	-	No
N6	-	12.6	-	-	No
N7	-	12.6	-	-	No
N8	-	12.6	-	-	No

Daily Mean PM₁₀ Results

Receptor ID	Without Development (exceedances)	With Development (exceedances)	Change (Days)	Impact/ Exceed
E1	0	0	0	No
E2	0	0	0	No
E3	0	0	0	No

Receptor ID	Without Development (exceedances)	With Development (exceedances)	Change (Days)	Impact/ Exceed
E4	0	0	0	No
E5	0	0	0	No
E6	1	1	0	No
E7	1	1	0	No
E8	1	1	0	No
E9	1	1	0	No
E10	1	1	0	No
E11	1	1	0	No
E12	1	1	0	No
E13	1	1	0	No
E14	1	1	0	No
N1	-	1	-	No
N2	-	1	-	No
N3	-	1	-	No
N4	-	1	-	No
N5	-	1	-	No
N6	-	1	-	No
N7	-	1	-	No
N8	-	1	-	No

Annual Mean PM_{2.5} Results

Receptor ID	Without Development (µg/m ³)	With Development (µg/m ³)	Change (µg/m ³)	% Change Relative to Objective	Impact/ Exceed
E1	9.6	9.6	0.0	0.0	Negligible
E2	9.3	9.3	0.0	0.0	Negligible
E3	8.9	8.9	0.0	0.0	Negligible
E4	9.0	9.0	0.0	0.0	Negligible
E5	8.6	8.6	0.0	0.0	Negligible
E6	8.4	8.4	0.0	0.0	Negligible
E7	8.5	8.5	0.0	0.0	Negligible
E8	8.4	8.4	0.0	0.0	Negligible
E9	8.4	8.5	0.1	0.0	Negligible
E10	8.4	8.4	0.0	0.0	Negligible
E11	8.4	8.4	0.0	0.0	Negligible
E12	8.4	8.4	0.0	0.0	Negligible
E13	8.3	8.4	0.1	0.0	Negligible
E14	8.3	8.3	0.0	0.0	Negligible
N1	-	8.4	-	-	No
N2	-	8.3	-	-	No
N3	-	8.3	-	-	No
N4	-	8.3	-	-	No
N5	-	8.3	-	-	No



Receptor ID	Without Development ($\mu\text{g}/\text{m}^3$)	With Development ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	% Change Relative to Objective	Impact/ Exceed
N6	-	8.3	-	-	No
N7	-	8.3	-	-	No
N8	-	8.4	-	-	No

References

- ¹ Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007).
- ² The Air Quality (England) Regulations 2000 – Statutory Instrument 2000 No. 928.
- ³ The Air Quality (England) (Amendment) Regulations 2002 – Statutory Instrument 2002 No. 3043.
- ⁴ The Air Quality Standards (Amendment) Regulations 2016 – Statutory Instrument 2016 No. 1184.
- ⁵ The Environment Act 1995.
- ⁶ The Environmental Protection Act 1990.
- ⁷ Department for Communities and Local Government (June 2019). National Planning Policy Framework.
- ⁸ Manchester Local Plan (2017-2027)
- ⁹ National Planning Practice Guidance (October 2019).
- ¹⁰ Local Air Quality Management Review and Assessment Technical Guidance (LAQM. TG16) (April 2016).
- ¹¹ IAQM. Land-Use Planning and Development Control: Planning for Air Quality (v1.2) (2017).
- ¹² IAQM. Guidance on the Assessment of Dust from Demolition and Construction. (v1.1) (2016).
- ¹³ Defra Emission Factor Toolkit. Available at: <https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>.
- ¹⁴ Defra Background Maps. Available at: <https://uk-air.defra.gov.uk/data/laqm-background-home>.
- ¹⁵ Defra NO_x to NO₂ Calculator. Available at: <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>.