

NOMA, 2&3 Angel Square

Air Quality Assessment

16 June 2022

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Glossary

Term	Definition
AQMA	Air quality management area
AQS	Air Quality Strategy
CAZ	Clean Air Zone
EPUK	Environmental Protection UK
GMCA	Greater Manchester Combined Authority
ISD	Integrated Surface Database
LAQM TG 16	Local air quality management technical guidance
MCC	Manchester City Council
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NPPF	National Planning Policy Framework
NRMM	Non-road mobile machinery
PM _{10/2.5}	Particulate matter
SPG	Supplementary Planning Guidance

Executive summary

Buro Happold has been commissioned by MEPC Limited to undertake an air quality assessment to support a detailed planning application for the proposed NOMA 2 & 3 Angel Square development. The Proposed Development involves the redevelopment of Plots M and N of the adopted NOMA Masterplan (to be known as 2 & 3 Angel Square) to deliver office-led development, with ground floor retail and commercial units, external terraces at upper levels, car parking and cycle facilities.

The Proposed Development comprises the erection of two high quality commercial office buildings of 13 and 14 storeys, alongside public realm, car parking, extensive cycle parking facilities, and associated highways and access arrangements.

The Site currently comprises two development plots, which are currently used as surface car parking with approximately 100 spaces. The site is located within the Manchester City Centre Air Quality Management Area, which was declared as a result of failing to meet certain air quality objectives.

During construction, site activities will have the potential to affect local air quality in particular from dust deposition and increases in particulate matter concentration. Mitigation measures are recommended for implementation to ensure that any impact on local air quality is not significant.

With regards to operational impacts, emissions from both traffic and combustion plant associated with the proposed development have been considered.

Although the Proposed Development includes 30 car parking spaces, there are approximately 100 spaces currently on site which will be removed as part of the development. The project transport consultant has confirmed that it is therefore likely that there will be a net decrease in flows as a result of the development, and therefore the impact from traffic emissions associated with the Proposed Development can be ruled not significant.

The assessment of combustion plant emissions has been scoped out of this assessment as the energy strategy solely relies on emission free equipment to meet hot water and energy demand. A back-up generator has been proposed for life safety purposes but given the limited testing hours and roof level flue, the impacts from this generator will be negligible.

The Proposed Development is located in an area of poor air quality, within the GMCA Air Quality Management Area and in close proximity to monitoring sites that have exceeded long term air quality objectives. As the Proposed Development is for office, commercial and retail space use, only the hourly objectives are applicable, and these have been met consistently at nearby monitoring locations in recent years.

It is therefore considered with the implementation of recommended construction mitigation measures; the Proposed Development would not have a significant impact on air quality and the site is suitable for the proposed use.

1 Introduction

1.1 Proposed Development

Buro Happold has been commissioned by MEPC Ltd to undertake an air quality assessment to support a detailed planning application for the proposed NOMA 2 & 3 Angel Square development. The Proposed Development involves the redevelopment of Plots M and N of the adopted NOMA Masterplan (to be known as 2 & 3 Angel Square) to deliver office-led development (Use Class E(g)), with ground floor retail and commercial units, external terraces at upper levels, car parking and cycle facilities.

The Proposed Development will comprise of the erection of two high quality commercial office buildings of 13 and 14 storeys, alongside public realm, car parking, extensive cycle parking facilities, and associated highways and access arrangements.

The Site (see Figure 1—1) measures approximately 0.83 hectares of previously developed land. The Site is bound by 1 Angel Square (the Co-operative Group headquarters), Miller Street, Angel Gardens residential scheme and Angel Street. The Site currently comprises two development plots, identified as Plots M & N on the endorsed NOMA Masterplan, which are in temporary use as surface car parking with approximately 100 spaces.

The Site is located to the north of Manchester City Centre, and approximately 200m from the Manchester Victoria railway station. This area of Manchester is a mixed urban development area, which is characterised by commercial offices and residential uses. The historic NOMA estate is located to the south of the Site and there are larger areas of residential located to the north of Angel Street.

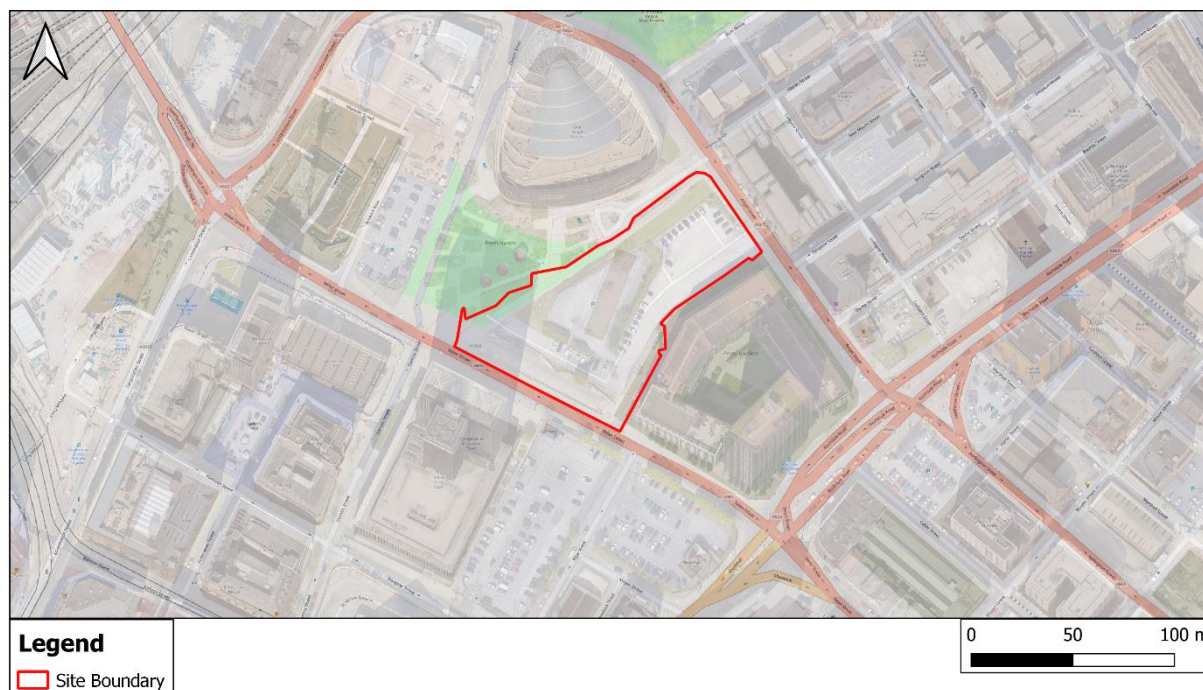


Figure 1—1 Site location

1.2 Scope of assessment

This report considers the air quality impacts associated with both the construction and operation of the development. Likely changes to air quality in the area, as a result of the Proposed Development have been considered. Also, where required, the assessment considers mitigation measures to reduce the impact of the Proposed Development on local air quality.

The Proposed Development will give rise to dust and particulate matter (PM_{10/2.5}) emissions during the construction phase, which will have the potential to affect local air quality. The impact of these emissions will be assessed in line with IAQM Construction Dust guidance¹ and will be based on currently confirmed details by the developer.

Operational impacts will also be considered as part of this assessment, for new developments these predominantly arise from two main sources:

- Emissions of nitrogen dioxide (NO₂), and particulate matter (PM_{10/2.5}) arising from traffic generated due to the development; and
- Emissions of NO_x from on-site combustion plant.

Emissions from these sources will be assessed with respect to the UK Air Quality Objectives and follow the best practice guidance as defined in Land Use Planning & Development Control: Planning for Air Quality (IAQM, 2017)² and following Local Air Quality Management principles and considerations.

As the site is located in an Air Quality Management Area on-site exposure to poor air quality will also be considered in this assessment. A qualitative assessment will be undertaken to comment on the likelihood of exceedances to relevant time-based air quality objectives, at sensitive receptor locations introduced by the Proposed Development.

¹Holman et al (2014). *IAQM Guidance on the assessment of dust from demolition and construction*, Institute of Air Quality Management, London. www.iaqm.co.uk/wp-content/uploads/guidance/dust_assessment.pdf.

² Moorcroft and Barrowcliffe et al. (2017) *Land-use Planning & Development Control: Planning for Air Quality*. V1.2. Institute of Air Quality Management, London. <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

2 Air Quality Legislation and Policy

2.1 European legislation

The 2008 Ambient Air Quality Directive (2008/50/EC) set legally binding limits for pollutant concentrations. This directive was made law in England through the Air Quality (Standards) Regulations 2010. The Regulations were subsequently updated in 2016 (The Air Quality Standards (Amendment) Regulations 2016).

2.2 UK legislation

Part IV of the Environment Act 1995 places a duty on the Secretary of State for the Environment to develop, implement and maintain an Air Quality Strategy (AQS) with the aim of reducing atmospheric emissions and improving air quality. The latest AQS for England, Scotland, Wales and Northern Ireland was published in 2007, and provides the framework for ensuring the air quality limit values are complied with based on a combination of international, national and local measures to reduce emissions and improve air quality. 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 (LAQM). This requires local authorities to regularly and systematically review and assess air quality within their boundaries against a series of objectives, and appraise development and transport plans against these assessments.

In areas where air quality objectives are not likely to be met by the relevant target date, local authorities are required to declare an Air Quality Management Area (AQMA) and develop an air quality action plan in pursuit of the air quality objectives. The national air quality objectives relevant to this assessment are detailed in Table 2-1.

Table 2-1 NO₂ and PM₁₀ National Air Quality Objectives included in the Air Quality (England) Regulations 2000

Pollutant	Objective
Nitrogen dioxide (NO ₂)	200µg/m ³ measured as a 1-hour mean, not to be exceeded more than 18 times a year
	40µg/m ³ measured as an annual mean
Particulate Matter (PM ₁₀)	50µg/m ³ measured as a 24-hour mean, not to be exceeded more than 35 times a year
	40µg/m ³ measured as an annual mean
Particulate Matter (PM _{2.5})	25µg/m ³ measured as an annual mean

The majority of AQMAs in the UK have been declared for exceedances of nitrogen dioxide (NO₂) and PM₁₀ in relation to traffic emissions. An AQMA has been declared by the Greater Manchester Combined Authority (GMCA) which includes an area covering Manchester City Centre and the main arterial traffic routes in the city owing to exceedances of the annual mean NO₂ objective. The Site is located within the GMCA AQMA.

Exceedances have been identified as being predominantly from road transport sources with 65%³ of NO₂ emissions within Greater Manchester attributable to road transport. Of the road transport emissions the majority are from diesel cars and diesel light goods vehicles, a full break down of the NO_x source apportionment is presented Figure 2—1.

³ Greater Manchester Combined Authority (GMCA) (2019) Greater Manchester's Plan for Homes, Jobs and the Environment. <https://www.greatermanchester-ca.gov.uk/what-we-do/housing/greater-manchester-spatial-framework/gmsf-full-plan/>

2.3 National planning policy

2.3.1 National Planning Policy Framework (MHCLG, 2019)

The National Planning Policy Framework (NPPF)⁴ underlines the importance of local authorities contributing towards improving and protecting the environment. The legislation points towards the need to focus on the enhancement of biodiversity, minimising waste and pollution, and mitigation/adaptation to climate change.

With particular regard to air quality management, Section 9 of the NPPF notes that the environmental impact of transport and traffic should be identified and assessed, whilst mitigating adverse effects to bring about net environmental gains. The guidance states that the planning system should actively manage patterns of growth, offering a choice of transport modes to reduce air pollution:

‘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.’

Further to this, Section 15 of the NPPF notes that planning policies should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of AQMAs and Clean Air Zones (CAZ), 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. Additionally, the NPPF states that planning decisions should ensure that any new development in AQMAs and CAZs is consistent with the local air quality action plan.

2.4 Planning Practice Guidance

Planning Practice Guidance (PPG)⁵ provides guiding principles on how the planning process can take account of the impact of new development on air quality. Guidance outlines when air quality considerations could be relevant to the development management process. The PPG states:

‘Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

Where air quality is a relevant consideration the local planning authority may need to establish:

- The ‘baseline’ local air quality, including what would happen to air quality in the absence of the development;
- Whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and

⁴ MHCLG The National Planning Policy Framework, February 2019

⁵ MHCLG Planning Practice Guidance, November 2019

- Whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.'

The guidance also outlines the specific issues that may need to be considered when assessing air quality impacts.

Relevant considerations include when a development would:

- 'Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;
- Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;
- Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;
- Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;
- Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value.'

Guidance also provides detail on how air quality impacts can be mitigated, stating that mitigation should be spatially specific, dependent on the proposed development, and proportionate to the likely impact. The following examples of mitigation are given:

- 'Maintaining adequate separation distances between sources of air pollution and receptors;
- Using green infrastructure, in particular trees, where this can create a barrier or maintain separation between sources of pollution and receptors;
- Appropriate means of filtration and ventilation;
- Including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);
- Controlling dust and emissions from construction, operation and demolition; and
- Contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development.'

2.5 Local policy and guidance

Manchester Core Strategy Development Plan (2012-2027) (Manchester City Council, 2012)

The Manchester Core Strategy Development Plan (MCC, 2012) is the primary strategic planning document in the city's Local Development Framework. It outlines the council's vision for Manchester for a period of 15 years (from 2012 to 2027) and sets out planning policies that aim to help the city achieve the Local Development Framework's vision.

With particular regard to air quality, Policy EN 16 (Air Quality) 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."

Policy EN 7 (Energy Infrastructure opportunities) sets out a general presumption in favour of low and zero carbon decentralised energy schemes, subject to a number of considerations. Those that relate to air quality in particular are as follows:

- *Any new generating plant capable of producing heat and cooling as well as electricity should be located in a way that facilitates future connection to a local distributed energy system.*
- *That any energy centre, including generating plant, standby/boiler plant and substations, shall be located and designed to a high quality so as to integrate with and contribute to the townscape.*
- *Biofuels should be obtained from sustainable sources and processes and in a way that minimise transport impacts, following a sequential approach in order to minimise CO₂ emissions – firstly prioritising local and regional sources, followed by national, European and international.*
- *Consideration should be given to biofuel delivery by rail and waterways where possible. Where large-scale fuel or feedstock delivery is required by road the energy centre must be located in or adjacent to light industrial, industrial or leisure uses with any impact on local residential amenity minimised.*
- *The cumulative impact of energy schemes will be taken into account when considering applications, to include modelled impacts on air quality and landscape character, with reference to Policy EN 16 (Air Quality).*

Policy EN 5 (Strategic Areas for low and zero carbon decentralised energy infrastructure) highlights strategic areas which will have a major role to play in achieving an increase in the level of decentralised, low and zero carbon energy supplies available. These areas include the following:

- The Regional Centre, which also includes the Oxford Road Corridor and Eastlands;
- District Centres and associated major development sites;
- Airport Strategic Site;
- Strategic housing location; and
- Strategic employment locations.

'Within these areas new development, regeneration and retrofit projects, will be expected to take place in the context of more detailed proposals for decentralised low and zero carbon energy infrastructure in the form of energy proposals plans. The Council will work with all relevant stakeholders, which may include developers, landowners, residents, community groups, private sector partners, utilities companies, neighbouring authorities and other public sector bodies, as appropriate, to bring forward such plans. Where investment or development is being undertaken into or adjacent to a public building/asset or district heating network, full consideration shall be given to the potential role that these can have in providing an anchor load within a decentralised energy network or in creating opportunities for CO₂ reduction funded by contributions.'

The Greater Manchester Strategy (GMCA, 2017 – updated 2018)

The Greater Manchester Strategy sets out the city's ambition to become one of the top places in the world to live and work. The strategy addresses key priorities aimed at improving education and skills, health, wellbeing, the environment, work opportunities, and economic growth across the towns, cities, communities, and neighbourhoods that make up Greater Manchester. The strategy has been prepared by all 10 councils, the Mayor, the NHS, transport/police/and fire services and has had input from a number of key stakeholders (the public, businesses, voluntary/community/social enterprise organisations, etc.).

With regards to improving the environmental conditions of Greater Manchester, particularly air quality, the following statement is made in the strategy (Priority 7 – A green city region and a high quality culture and leisure offer for all):

"Air pollution and greenhouse gas emissions cause significant harm to the environment, to the health of communities, and damage Greater Manchester's economy. Road transport contributes 32% of carbon dioxide emissions with emissions from commercial and domestic buildings accounting for 32% and 37% respectively."

The strategy highlights the need to rethink how energy is supplied, managed, and consumed in Greater Manchester. It identifies the need for "urgent innovation in our buildings, transport, and energy infrastructure." Greater Manchester will work with local and national stakeholders to develop a means of responding to these challenges through the preparation of their Climate Change and Low Emissions Implementation Plan and by defining "a robust low carbon pathway to 2050 to accelerate the point at which Greater Manchester can become carbon neutral."

Through a combination of sustained proactive national policy, aligning of priorities, and resources from Greater Manchester, the city will develop new local renewable energy sources and improve the energy efficiency of new and existing building stock; in turn helping reduce emissions and energy bills for residents and businesses. Additionally, the strategy notes the importance of adapting to a rapidly changing energy system. With the challenges of decarbonisation, ageing infrastructure, and the expectation that energy availability should adapt to demand shows that there needs to be a change in the way we supply, manage, and consume energy. As such, the Greater Manchester Strategy highlights a need to deploy smart energy systems such as storage systems to reduce energy consumption and shift/reduce peak demand. In turn, helping consumers be aware of and minimise their energy usage and bills.

Manchester Climate Change Framework 2020-25 (Manchester Climate Change Agency and Partnership, 2019)

Manchester has set itself the target of being carbon net zero by 2038. The Manchester Climate Change Agency and Partnership published its climate change framework for Manchester⁶ in 2020, setting out the strategy, from 2020 to 2025, for working towards achieving their longer-term climate ambitions. This builds upon the high-level draft Manchester Zero Carbon Framework 2020-38⁷, which was endorsed by Manchester City Council.

The framework outlines how Manchester will play its part in limiting the impacts of climate change and creating a healthy, green and socially just city. This is based around four key objectives:

1. Staying within carbon budgets;
2. Climate adaptation and resilience;
3. Health and wellbeing; and
4. Inclusive, zero carbon and climate resilient economy.

Of particular relevance to air quality is objective 3: Health and Wellbeing. The aim of this objective is:

"To improve the health and wellbeing of everyone in Manchester through actions that also contribute to our objectives for CO2 reduction and adaption and resilience, with particular focus on those most in need"

Within this objective, the importance of moving away from combustion-based vehicle dependency and promoting active transport to improve health through both physical activity and air quality improvement, is discussed. It also highlights the importance of green space for safeguarding the mental and physical health of Manchester residents. The importance of social justice in climate action is noted within this objective, describing how the focus should be on the people and communities that will see the greatest improvement in health and wellbeing through climate action i.e. those that will be worst impacted by climate change. These people and communities have often made a lesser contribution to climate change.

The framework sets out seven headline areas for urgent action in order to meet climate commitments. Several of these actions will have air quality co-benefits, including:

2. Renewable Energy

"At the time of writing UK Government are in the early stages of developing a national strategy. However, we can't wait for this to emerge before we start to take action. There are four things we need to do:

- *Improve the energy efficiency of our buildings as far as possible to reduce our demand for gas (as in the above 'buildings' section).*
- *Replace our natural gas-based heating systems with renewable energy-based heating technologies as soon as possible.*

⁶ Manchester Climate Change Agency and Partnership. (2020). Manchester Climate Change Framework 2020 -25 <https://www.manchesterclimate.com/framework-2020-25>

⁷ Manchester Climate Change Agency and Partnership. (2019). Draft Manchester Zero Carbon Framework 2020 - 2038 <https://www.manchesterclimate.com/framework-2020-2038>

- *Work with Government to ensure that moving to electricity-based heating systems is affordable and doesn't push even more people into fuel poverty (electricity is currently more expensive than natural gas).*
- *...*
-

3. Transport and flying

"There are five headline actions we need to take:

- *Increase walking and cycling: through a combination of significantly more safe, well-designed routes and changes in travel behaviours*
- *Increase public transport use: again, this is partly about changes in behaviours, but will only work if enabled by significant improvements in the capacity, frequency, reliability, affordability and accessibility of our buses, trams and trains. Our current system falls well short of these essential characteristics.*
- *Private vehicles: where travel by private vehicle is necessary, we need these to be electric vehicles, supported by easily accessible charging points, and with the right incentives to accelerate their uptake. Simple 13 amp outdoor plugs will meet most drivers' needs, with more expensive superfast chargers only required for a minority of vehicle-users. However, we need to keep in mind that the shift to electric vehicles won't address our problems with congestion. The manufacturing of vehicles (in cities outside of Manchester) also generates significant CO2 emissions, contributing to our consumption-based CO2 emissions.*
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- *...*

6. Green infrastructure and nature-based solutions

"Our parks, gardens, woodlands, street trees and other elements of the city's green infrastructure have an essential role to play in helping Manchester to meet its climate change objectives. This is in terms of both adapting Manchester to the changing climate (by helping to manage flood risk and heat stress) and helping to reduce our CO2 emissions (to stay within our carbon budget we need our land to become a net remover of carbon). And at the same time also delivering myriad other benefits such as improved health, increased biodiversity, supporting jobs, creating attractive neighbourhoods, and many others."

Greater Manchester Air Quality Action Plan (2016-2021)

As a result of the declaration of this AQMA, an Air Quality Action Plan has been published which outlines the mitigation measures and strategic approach the GMCA and MCC will take to improve air quality within the city and surrounding boroughs. The seven targeted actions for improving air quality, and specific mitigation measures, are outlined below:

Actions for Managing New Development

- *Creation and management of a database of significant planning application and related air quality assessments;*

Actions for Freight Vehicles

- *Locations for potential distribution centres will be identified in the Greater Manchester Spatial Framework;*

Actions for Buses

- *Consideration and trial of a range-extender bus or other ultra-low emission vehicles which can be implemented to the wider public transport strategy;*

Actions for Cycling

- *Improvement to the cycle networks focusing on safe green routes, away from areas of high pollution;*

Actions for Travel Choices

- *Appraisal of existing car sharing schemes and their impacts on modal shift. Use this information to expand existing schemes and inform future areas of focus;*

Actions for Car

- *Continual expansion of EV charging points through the Plugged-in-Places programme; and*

Actions for Information and Resources

- *More resource and investment to the GreatAir Manchester website⁸.*

GMCA were one of 33 Local Authorities who were issued a ministerial direction from the UK Government to tackle air quality issues and achieve compliance with air quality objective limits in the shortest time frame possible. In response to this, GMCA have carried out feasibility studies into the implementation of a Clean Air Zone (CAZ) across the areas that suffer from poor air quality. This appraisal assessed the different ways to implement a CAZ, and include an air quality assessment, health impact assessment and an economic assessment. The details of, and area covered by, the CAZ is currently under review (see below).

⁸ Clean Air Greater Manchester (2019). *Clean Air Greater Manchester – Our journey to clean air*. [online] <https://www.greatermanchester-ca.gov.uk/media/1272/air-quality-action-plan-2016-21.pdf>

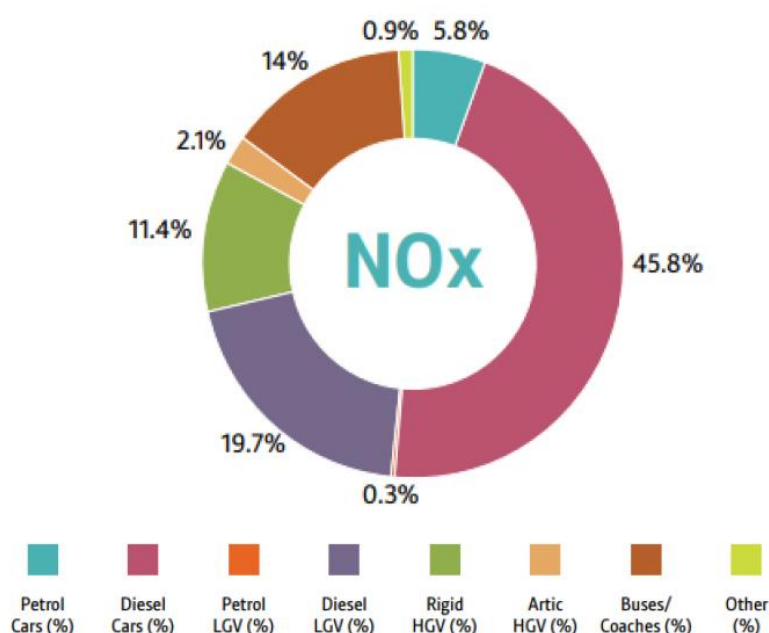


Figure 2—1- Estimated source of emissions of NO_x in Manchester

Greater Manchester Clean Air Plan (following consultation) (2021)⁹

The UK Government instructed a number of local authorities across the UK to act to lower NO₂ concentrations below the legal objectives through strategic interventions such as clean air zones. GMCA worked with Transport for Greater Manchester to develop a clean air plan to lower concentrations at locations of exceedances across their remit. The following measures were proposed:

- Greater Manchester Charging Clean Air Zone;
- Clean Bus Fund;
- Vehicle Finance;
- Clean Commercial Vehicle Fund;
- Clean Taxi Fund;

Of these five measures, the city wide Clean Air Zone (CAZ) is most relevant to the development. The proposed CAZ covered all ten boroughs of Greater Manchester, introducing emission based charges for heavy duty vehicles (HDVs), light goods vehicles and taxis. Private vehicles and motorcycles were exempt from charges. Due to the anticipated financial implications for people in Manchester, the initial proposal was scrapped and the CAZ did not come into force on the initial start date of 30th May 2022. A new Clean Air Plan is being drafted and due to be delivered to government by July 2022.

⁹ GMCA (2021) Greater Manchester's Clean Air Plan to Tackle Nitrogen Dioxide Exceedances at the Roadside

3 Baseline Conditions

3.1 Baseline assessment methodology

Baseline data was gathered from the following sources:

- Manchester City Council (MCC) Air Quality Annual Status Report, and;
- Defra's national air quality background maps;

3.2 Air Quality Data

3.2.1 Air quality monitoring

GMCA undertake air quality monitoring at 200+ monitoring sites across the 10 local authorities within Greater Manchester; 37 of these sites are located within Manchester City Council. There are three automatic monitors in Manchester City Council and 35 non-automatic monitoring sites (diffusion tubes). Monitoring site MAN88 is the closest monitoring site to the development, located 20m from the southern perimeter. A number of diffusion tube sites are located in close proximity to the NOMA development. Nearby monitoring locations are presented in

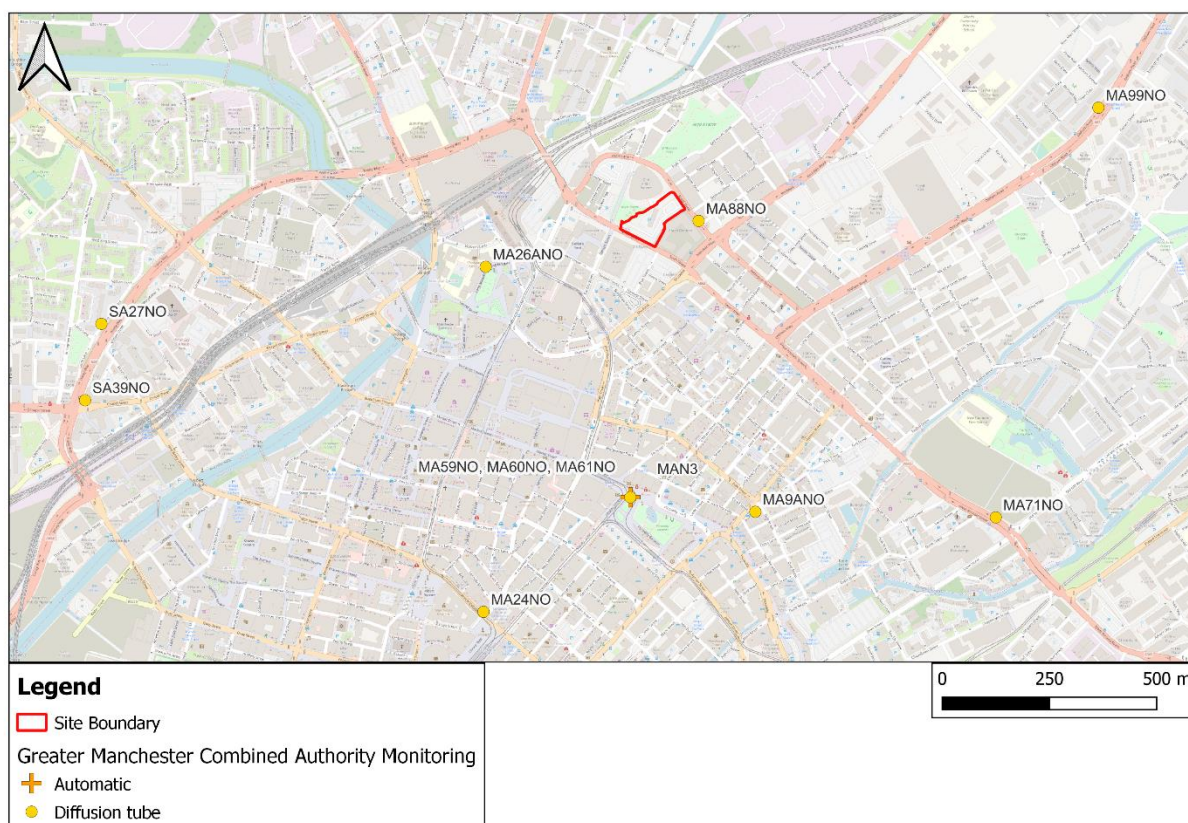


Figure 3—1.

Monitoring data presented Table 3-1 to Table 3-3 indicates that air quality objectives are exceeded regularly at urban traffic (i.e. roadside) monitoring sites on both Angel Street and Newton Street. All but one roadside and kerbside monitoring site exceeded the annual mean limit for NO₂ in 2019, and several sites (SA39NO, MA24NO, etc.) recorded increased concentrations from the previous year of monitoring. This may be indicative of traffic worsening on the adjacent roads. MAN88 monitored a concentration of 45.2 µg/m³ in 2019, exceeding the annual mean air quality objective.

2020 concentrations show sharp declines due to the COVID-19 pandemic and enforced restrictions on travel, concentrations reduced by ~30% at all monitoring locations which demonstrates the issues with transport emissions in this area.

At the Manchester Piccadilly automatic station, the annual mean NO₂ objective was last exceeded in 2016, however monitored background pollutant concentrations have reduced year on year. The site monitored within 10% of the annual mean objective in 2019, but again showed considerable reductions in 2020.

With respect to particulate matter concentrations, short term and long term PM₁₀ and PM_{2.5} objectives have been met in recent years at MAN3.

Table 3-1 Non-Automatic Monitoring Sites in Proximity to the Development Site

Site ID	Location	Site type	NO ₂ concentration (µg/m ³)				
			2016	2017	2018	2019	2020
MA24NO	Princess Street	Kerbside	45.3	44.7	40.3	40.8	26.8
MA26ANO	Chethams School	Urban Background	<u>37.1</u>	35.5	33.4	33.0	22.9
MA59NO, MA60NO, MA61NO	Piccadilly Gardens	Urban Background	40.8	35.7	31.6	33.1	22.3
MA71NO	Great Ancoats St	Roadside	51.2	50.4	46.1	45.3	31.4
MA88NO	Angel St	Kerbside	57.8	57.9	46.8	45.2	30.1
MA99NO	Oldham Road	Roadside	-	-	-	-	26.9
MA9ANO	Newton Street	Kerbside	51.9	51.5	45.8	44.9	32.5
SA27NO	Trinity Way	Roadside	<u>39.8</u>	<u>36.8</u>	34.1	<u>37.2</u>	26.7
SA39NO	Trinity Way / Chapel St	Roadside	46.8	41.6	<u>39.1</u>	41.7	30.4

Figures in **bold** indicate an exceedance of the long term air quality objective

Table 3-2 Automatic NO₂ Monitoring Data in the City of Manchester

Site ID	Site Name	Site type	Annual mean NO ₂ concentration (µg/m ³)					Number of hourly mean NO ₂ exceedances > 200 µg/m ³ (18 allowable)				
			2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
MAN3	Manchester Piccadilly	Urban Centre	40	<u>36</u>	35	<u>36</u>	27	0	1	0	0	0

Figures in **bold** indicate an exceedance of the air quality objective

Table 3-3 Automatic PM₁₀ Monitoring Data in the City of Manchester

Site ID	Site Name	Site type	Annual mean PM ₁₀ concentration (µg/m ³)					Number of 24-hourly mean PM ₁₀ exceedances > 50 µg/m ³ (35 allowable)				
			2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
MAN3	Manchester Piccadilly	Urban Centre	20	20	21	20	15	3	3	2	7	1

Figures in **bold** indicate an exceedance of the air quality objective

Table 3-4 Automatic PM_{2.5} Monitoring Data in the City of Manchester

Site ID	Site Name	Site type	Annual mean PM _{2.5} concentration (µg/m ³)				
			2016	2017	2018	2019	2020
MAN3	Manchester Piccadilly	Urban Centre	10	8	11	12	8

Figures in **bold** indicate an exceedance of the air quality objective

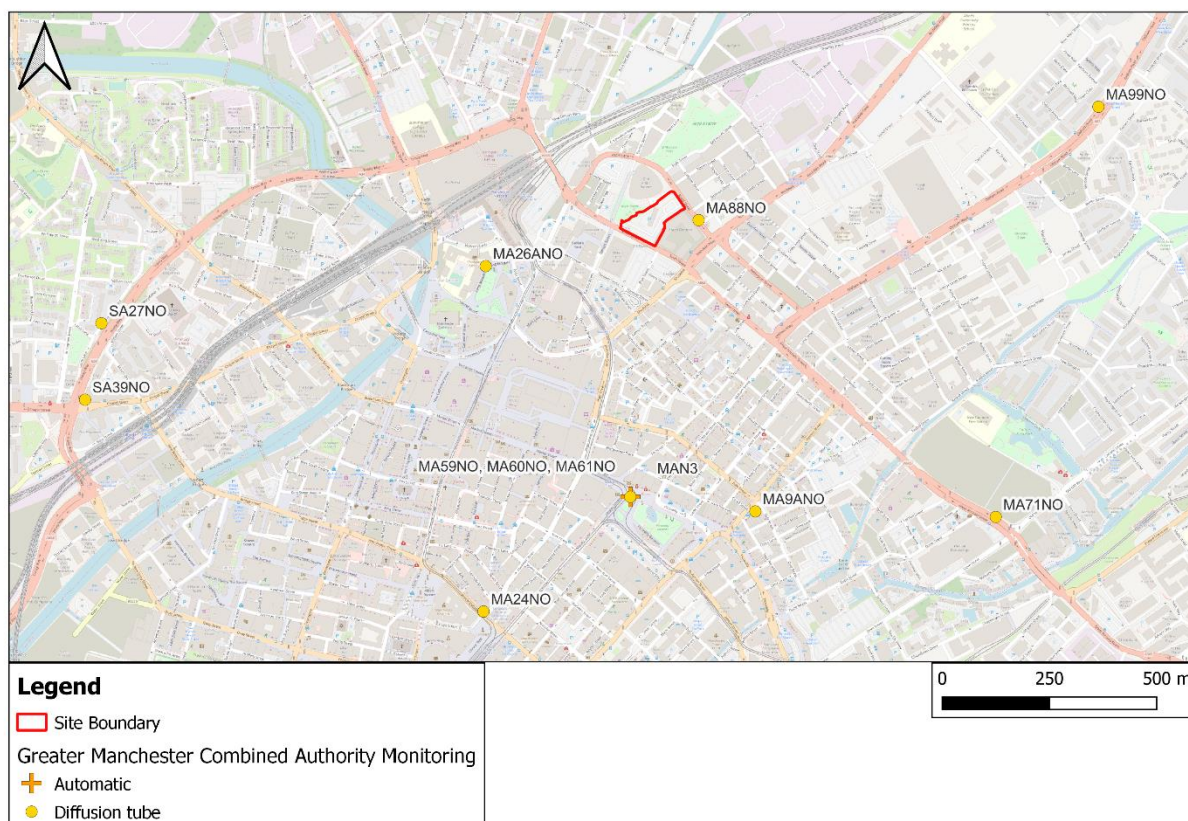


Figure 3—1 Nearby monitoring sites

3.2.2 Background air quality data

The Defra website includes estimated background air pollution data for NO₂, PM₁₀ and PM_{2.5} for each 1km by 1km OS grid square. Background pollutant concentrations are modelled from the reference year of 2018 based on ambient monitoring and meteorological data from 2018, and includes projections for future years up to 2030.

The development lies across two grid squares, and in the interest of worst case assumptions, the grid with the highest predicted concentrations has been presented below (centred at 384500, 398500). Annual mean concentrations of all pollutants of concern meet their relevant objectives, which is to be expected for background pollutant concentrations, however the monitored background NO₂ concentration at the monitoring site MA26NO is within 80% of the long term air quality objective for NO₂.

Table 3-5 Predicted Defra mapped background concentrations of NO_x, NO₂, and PM₁₀ for 2019

Pollutant	Annual mean background concentrations (µg/m ³)
	2019
Nitrogen dioxide (NO ₂)	29.3
Particulate matter (PM ₁₀)	13.6
Particulate matter (PM _{2.5})	8.8

Table 3-6 Monitored background concentrations of NO₂ for 2019

Pollutant	Annual mean background concentrations (µg/m ³)
	2019
MA26NO	
Nitrogen dioxide (NO ₂)	33.0

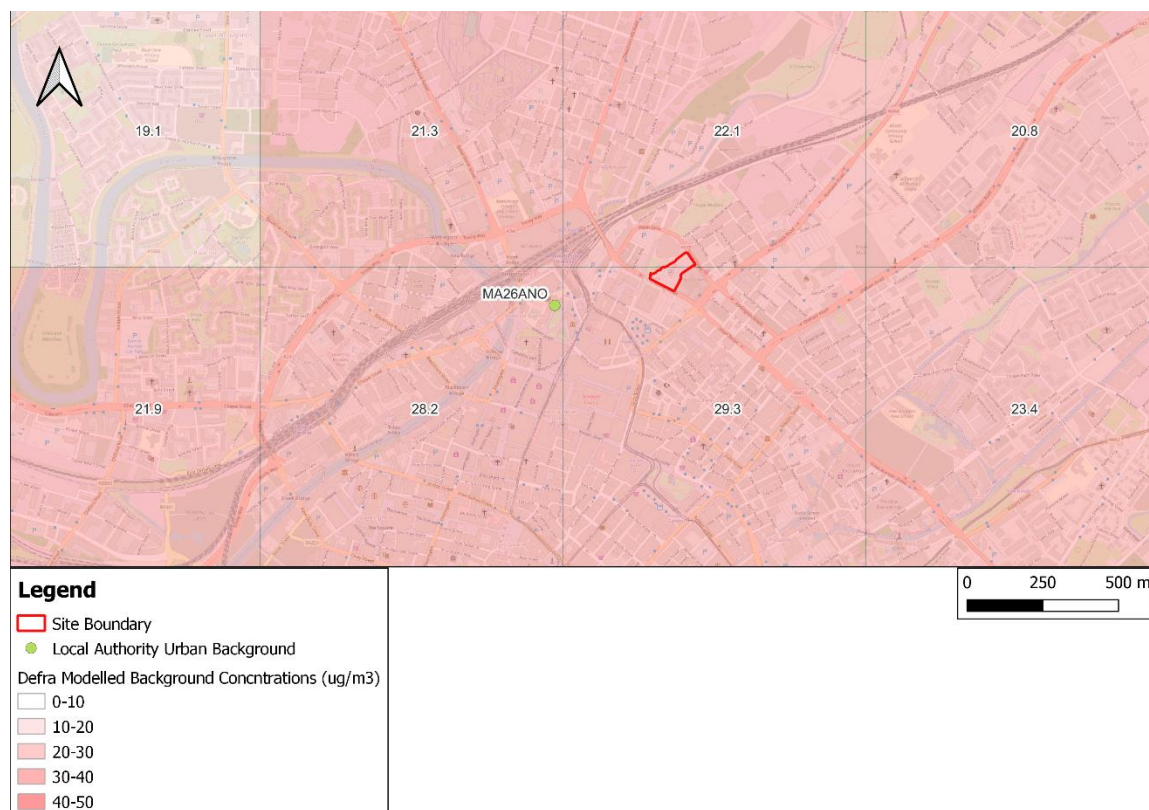


Figure 3—2 DEFRA Background Concentrations nearby NOMA

4 Construction impacts

4.1 Construction assessment methodology

Potential construction impacts have been assessed in accordance with the Institute of Air Quality Management (IAQM) best practice guidance¹⁰. This guidance provides a methodology for assessing air quality impacts from demolition, earthworks, construction and trackout¹¹ activities which may be associated with a development.

The IAQM dust assessment methodology involves the following steps:

1. A screening assessment to identify the need for detailed assessment. Detailed assessment will be required where there is:
 - A human receptor within:
 - 350m of the site boundary; or
 - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).
 - An ecological receptor within:
 - 50m of the site boundary; or
 - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

IAQM has deliberately made the screening criteria conservative in order to ensure that most, if not all, development schemes will require assessments of their air quality impacts.

2. Assess the risk of dust impacts by:
 - (a) defining the potential dust emission magnitude,
 - (b) defining the sensitivity of the area, and
 - (c) assessing the risk of impacts. (Criteria for defining the dust impacts are shown in Appendix A).
3. Determine site-specific mitigation for each of the four possible construction activities; and
4. Examine residual effects to determine whether or not these are significant.

This assessment will focus on earthworks, construction, and trackout. IAQM guidance suggests that the significance of any adverse effects are reported post-mitigation, assuming all actions to avoid or reduce environmental effects are an inherent part of the Proposed Development.

¹⁰ Holman et al (2014). *IAQM Guidance on the assessment of dust from demolition and construction*, Institute of Air Quality Management, London. www.iaqm/wpcontent/uploads/guidance/dust_assessment.pdf.

¹¹ Trackout refers to the transport of dust and dirt from the construction 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 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.

4.2 Construction assessment

The IAQM guidance criteria used to assess the potential impacts from construction activities is detailed in Appendix A. The following steps explain the site specific assessment in the context of the IAQM criteria.

Step 1: Screen the Need for a Detailed Assessment

In accordance with screening criteria in the IAQM guidance, an assessment is required as receptors are located within 350m of the site boundary, and within 50m of the routes used by construction vehicles on the public highway up to 500m from the site entrance.

Step 2A: Define the Potential Dust Emission Magnitude

Dust emission magnitudes for relevant construction activities are shown in Table 4-1.

Table 4-1 Dust emission magnitudes

Activity	Dust emission magnitude
Earthworks	Medium
Construction	Large
Trackout	Medium

Due to the size of the Site (~6,500m²) and scale of the development, the magnitude of dust emissions during earthworks has the potential to be medium. The dust emission magnitude during construction is determined to be large, owing to both plots being above ten storeys and the combined building volume being >100,000m³. Construction traffic movements are assumed to be medium (10-50 outward HDV movements per day) There is no demolition associated with the development as no structures are currently present on site.

Step 2B: Define the sensitivity of the area

The sensitivity of the surrounding area to potential construction impacts is detailed in Table 4-2.

Table 4-2 Area sensitivity

Potential impact	Sensitivity of surrounding area		
	Earthworks	Construction	Trackout
Dust soiling	High	High	High
Human health	Low	Low	Low

The surrounding area has a high sensitivity to potential dust soiling impacts. This level of sensitivity has been determined due to the number of receptors within 50m of the Proposed Development. There are three residential apartment complexes along Angel Street which have a high density of residential receptors, the nearest being with 30m of the north east perimeter of the Site. Beyond this, there are further residential units along Crown Lane to the north of the development. The sensitivity of the area to human health impacts is determined to be low as the annual mean PM₁₀ concentration is considerably below 24 µg/m³ threshold detailed in IAQM construction dust guidance.

Meteorological data from the nearest meteorological station indicates that the most frequent winds come from the south, so it can be expected construction dust will be transported north. The nearest residential receptors are located to the north east of the Site, and so may be impacted by the transported construction dust from site.

Figure 4—1 gives an overview of receptors within 350m of the development site, this is not an exhaustive identification of every nearby receptor but gives an indication of areas most sensitive to dust soiling and human health impacts.

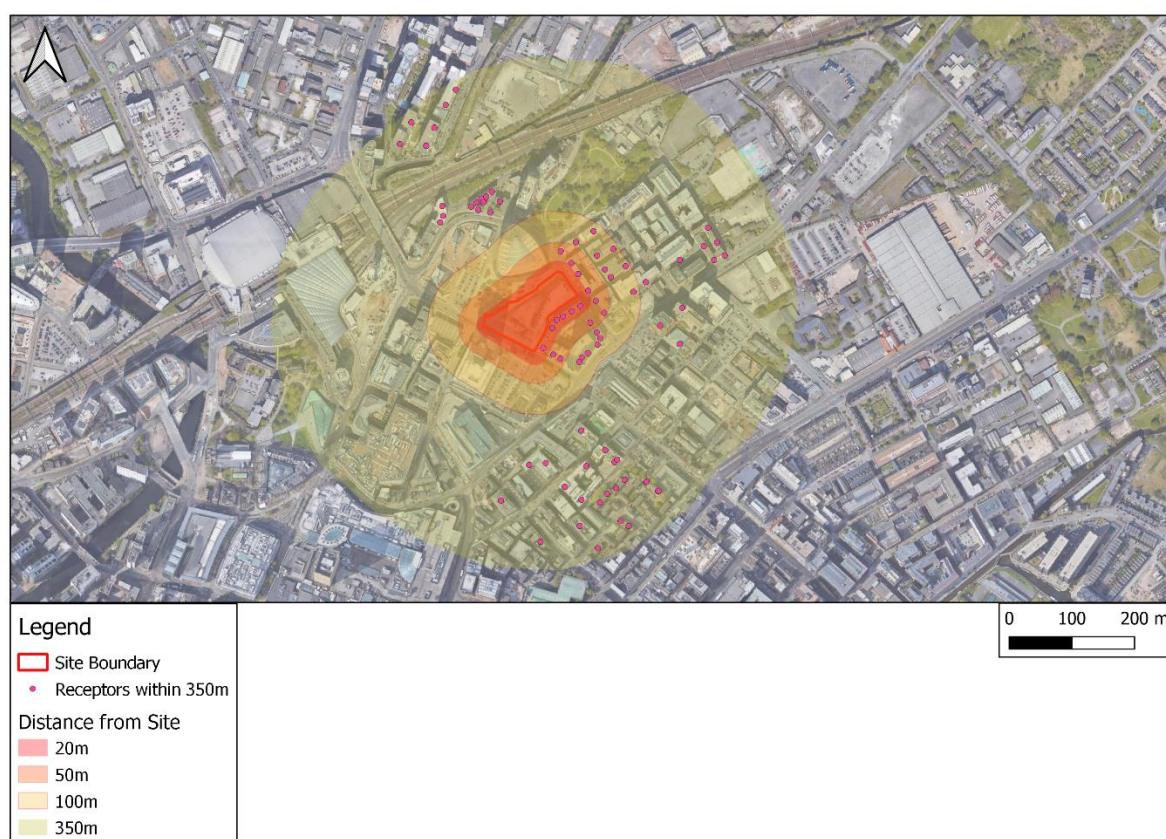


Figure 4—1 Receptors within 350m of the Proposed Development

Step 2C: Define the risks of impacts

The risk of dust impacts for relevant construction activities are summarised in Table 4-3. These results take into account both the potential dust emission magnitude and the sensitivity of the area. Results show that the risk is considered medium for earthworks, high for construction, and low for trackout. It should be noted, however, that whilst the risk of dust impacts is low and that activities on site will be temporary in nature, mitigation appropriate to the level of risk and in line with good industry practices will be implemented across the Site to ensure any adverse effects are minimised. Section 7 sets out appropriate mitigation measures to ensure the impact from construction activities will not be significant.

Table 4-3 Summary of risk from dust impacts

Source	Dust soiling	Human health
Earthworks	Medium Risk	Low Risk
Construction	High Risk	Low Risk
Trackout	Low Risk	Low Risk

4.3 Construction traffic emissions

At this stage of development there are no detailed predictions for construction traffic flows, however a construction traffic logistics plan is recommended to be prepared to ensure that construction traffic is kept to a minimum. The traffic management plan will address the following key issues;

- Traffic management procedures;
- Cumulative traffic impacts;
- Car parking and loading bays; and
- Access, egress and turning points.

The construction traffic plan should ensure peak construction year construction traffic (both from construction staff and delivery of materials) remains below the relevant IAQM thresholds indicative of the need for detailed assessment. Given the sites location in an AQMA, this means construction traffic should not exceed 25 HDVs AADT or 100 LDVs AADT across the peak construction year.

5 Operational Impacts

5.1 Criteria for assessing operational impacts

The EPUK/IAQM has published guidance on consideration of air quality within the planning and development control process. This guidance includes criteria which identify when relevant operational impacts can be screened out, or require further assessment. Criteria relevant to this assessment are detailed in Table 5-1.

Table 5-1 Indicative criteria for requiring an air quality assessment

The development will:	Indicative criteria to proceed to an air quality assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans.	A change of LDV flows of: - more than 100 annual average daily traffic (AADT) within or adjacent to an AQMA - more than 500 AADT elsewhere.
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NO _x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

5.2 Traffic emissions

The Proposed Development includes provision for 30 parking spaces, 15 for each Development Plot. There are approximately 100 spaces currently on site which will be removed as part of the development.

The project transport consultant has confirmed that there will be a net decrease in flows as a result of the development, and therefore the impact from traffic emissions associated with the Proposed Development can be ruled not significant.

5.3 Combustion plant emissions

The Energy Strategy of the development is to be entirely emission free, with heating and hot water demand being met by a combination of air source heat pumps and roof mounted photovoltaic solar panels. There is a back-up generator proposed which will be used for life-safety and emergency purposes, the flue for this generator terminates above roof level. The generator testing programme indicates that testing would take place for less than 18 hours per annum, and therefore owing to the limited hours of operation any impact associated with generator emissions is likely to be negligible.

5.4 On-site exposure

As the development is located within an air quality management area (AQMA) it is necessary to consider the exposure of future site occupants to poor air quality and assess the likelihood of exceedances to air quality objectives at relevant locations across the development site. Air quality objectives are based on standards which are set at a level below the lowest concentration at which more sensitive members of the public have been observed to be affected by pollutant exposure. The locations that are relevant are dependent on land use, and the expected length of time an individual will reasonably be in a given area. Defra Technical Guidance (TG16) specifies the locations where air quality objectives should be considered, Table 5-2 gives an overview of these locations.

The proposed development is predominantly office, with commercial / retail land use at ground floor. This means that only the hourly objective for NO₂¹² set out in Table 2-1 are relevant to the proposed use. In the event expected pollutant concentrations exceed hourly objectives, the site will require mitigation.

Table 5-2 Receptor sensitivity principles: operation

Averaging period	Sensitive receptors occur at	Sensitive receptors generally do not occur at
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24 hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
Hourly mean	All locations where the annual mean and 24-hour mean objective apply. Kerbside sites (for example, pavements of busy shopping streets) Any outdoor locations where members of the public might reasonably expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access.

¹² 200µg/m³ measured as a 1-hour mean, not to be exceeded more than 18 times a year

The nearest monitoring NO₂ site to the development is MAN88NO, located 42m from the north perimeter of the Site Boundary. As this monitoring site is a non-automatic (diffusion tube) monitor, the results only provide monthly averages which are then averaged across the full calendar year to give the annual mean concentration. Defra research has identified that exceedances of the NO₂ 1-hour mean are unlikely to occur when the annual mean is below 60 µg/m³ at locations where the main source of emissions is road transport emissions. MAN88NO recorded a concentration of 45.2 µg/m³ in 2019 and has never exceeded a concentration of 60 µg/m³ since it was first set up.

Furthermore, MAN88NO is located 0.5m from the Angel Street kerb, whereas the facade of the plot closest to the development is ~5m from the kerbside. NO₂ concentrations drop off significantly with distance from kerbside, and the Defra 'NO₂ Drop Off Calculator'¹³ tool allows for quantitative assessment of this. Assuming a distance of 4.5m, the expected concentration is 40.8, which is 10.1% lower than recorded at MAN88NO; well below the 60 µg/m³ indicative of exceedances to the short term objectives. A visualisation of the drop off in concentrations is presented in Figure 5-1.

It is also worth noting that NO₂ concentrations are expected to reduce year on year, owing to;

- improvements in emission abatement technology in the vehicle fleet;
- reduction in background concentrations across the UK; and
- policy measures to reduce emissions and increase uptake in sustainable travel options.

It is expected that the NO₂ hourly mean concentrations are not likely to be exceeded at the project site, and therefore no mitigation will be required to ensure site suitability.

¹³ Defra (2016) NO₂ Fall off with distance calculator. <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/no2-falloff/>

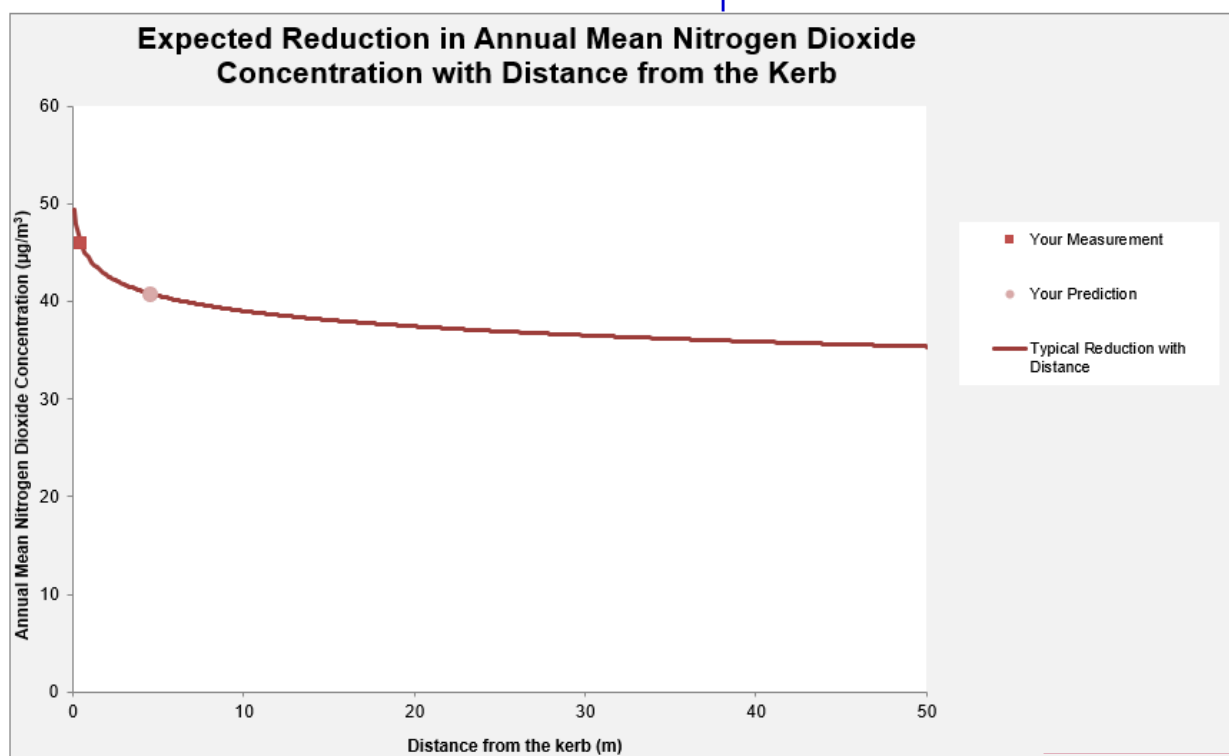


Figure 5—1 Visualisation of NO_2 concentration drop off with distance from Kerb

6 Mitigation measures

6.1 Construction

Site specific mitigation measures

Step 3 of the IAQM guidance sets out a framework for determining appropriate mitigation measures based on the predicted risk (Step 2C), and also allowing for a level of professional judgment. The following mitigation measures can be incorporated into the development so as to ensure that the residual effects from construction are insignificant.

As the Site is classed as medium risk the following mitigation measures are highly recommended:

Communications:

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager;
- Display the head or regional office contact information; and
- 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 highly recommended measures in this document. The desirable measures should be included as appropriate for the Site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real time PM₁₀ continuous monitoring and/or visual inspections.

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, either on- or offsite, and the action taken to resolve the situation in the log book; and
- Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport deliveries which might be using the same strategic road network routes.

Monitoring:

- 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;
- Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations 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; and
- 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 site boundary, with cleaning to be provided if necessary.

Site preparation and maintenance:

- 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 runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Vehicle and machinery operation:

- 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;
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;
- 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); and
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Site operations:

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the Site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management:

- Avoid bonfires and burning of waste materials.

Measures specific to demolition:

- Ensure 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;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives;
- Bag and remove any biological debris or damp down such material before demolition; and
- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).

Measures specific to earthworks:

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

Measures specific to construction:

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Avoid scabbling (roughening of concrete surfaces) if possible;
- 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; and

- For smaller supplies 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;
- Record all inspections of haul routes and any subsequent action in a site log book; and
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the Site where reasonably practicable).

6.2 Operation

As the impact from all operational aspects of the development are considered insignificant, no further mitigation is required.

7 Conclusions

There is a risk of air quality impact during both the construction and operational phases of the development, namely from transport emissions, combustion plant emissions and emissions from construction activity (demolition, earthworks, etc.).

Given the scale of the development, there is high risk of dust soiling and low risk of health impacts during the construction phase. A suite of mitigation measures is presented in Section 6, these will be implemented within the Construction Management Plan (CMP) in order to minimise emissions during construction. Ensuring these measures are implemented effectively and reviewed regularly during the construction phase, the impact on local air quality during construction will be not significant

With regards to operational impacts, emissions from both traffic and combustion plant associated with the proposed development have been considered.

Although the Proposed Development includes 30 car parking spaces, there are approximately 100 spaces currently on site which will be removed as part of the development. The project transport consultant has confirmed that it is therefore likely that there will be a net decrease in traffic flows as a result of the development, and therefore the impact from traffic emissions associated with the Proposed Development can be ruled not significant.

The assessment of combustion plant emissions has been scoped out of this assessment as the energy strategy solely relies on emission free equipment to meet hot water and energy demand. A back-up generator has been proposed for life safety purposes but given the limited testing hours and roof level flue, the impacts from this generator will be negligible.

The Proposed Development is located in area of poor air quality, within the GMCA Air Quality Management Area and in close proximity to monitoring sites that have exceeded long term air quality objectives. As the Proposed Development is office, commercial and retail space, the only relevant objectives are the hourly objectives, and these have been met at nearby monitoring locations.

It is therefore considered with the implementation of recommended construction mitigation measures; the Proposed Development would not have a significant impact on air quality and the site is suitable for the proposed use.

Appendix A IAQM Construction Assessment Methodology

Assessing the risk of dust impacts

A) Defining the potential dust emission magnitude

The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large.

Demolition: Example definitions for demolition are:

- **Large:** Total building volume $>50,000 \text{ m}^3$, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities $>20 \text{ m}$ above ground level;
- **Medium:** Total building volume $20,000 \text{ m}^3 - 50,000 \text{ m}^3$, potentially dusty construction material, demolition activities $10\text{-}20 \text{ m}$ above ground level; and
- **Small:** Total building volume $<20,000 \text{ m}^3$, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities $<10\text{m}$ above ground, demolition during wetter months.

Earthworks: Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling the Site and landscaping. Example definitions for earthworks are:

- **Large:** Total site area $>10,000 \text{ m}^2$, 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 $>8 \text{ m}$ in height, total material moved $>100,000$ tonnes;
- **Medium:** Total site area $2,500 \text{ m}^2 - 10,000 \text{ m}^2$, moderately dusty soil type (e.g. silt), $5\text{-}10$ heavy earth moving vehicles active at any one time, formation of bunds $4 \text{ m} - 8 \text{ m}$ in height, total material moved $20,000$ tonnes – $100,000$ tonnes; and
- **Small:** Total site area $<2,500 \text{ m}^2$, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds $<4 \text{ m}$ in height, total material moved $<20,000$ tonnes, earthworks during wetter months.

Construction: The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s) / infrastructure, method of construction, construction materials, and duration of build. Example definitions for construction are:

- **Large:** Total building volume $>100,000 \text{ m}^3$, on site concrete batching, sandblasting;
- **Medium:** Total building volume $25,000 \text{ m}^3 - 100,000 \text{ m}^3$, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- **Small:** Total building volume $<25,000 \text{ m}^3$, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout: Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology and duration. As with all other potential sources, professional judgement must be applied when classifying trackout into one of the dust emission magnitude categories. Example definitions for trackout are:

- **Large:** >50 HDV (>3.5t) outward movements¹⁴ in any one day¹⁵, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m;
- **Medium:** 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m; and
- **Small:** <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

These numbers are for vehicles that leave the Site after moving over unpaved ground, where they will accumulate mud and dirt that can be tracked out onto the public highway.

B) Defining the sensitivity of the area

The sensitivity of the area takes account of a number of factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM₁₀, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Examples of sensitivities of various receptors to dust soiling, elevated PM₁₀ and ecological effects are shown in Table 7-1.

For the sensitivity of people and their property to soiling, the IAQM recommends that the air quality practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the general principles in the table below.

For the sensitivity of people to the health effects of PM₁₀, the IAQM recommends that the air quality practitioner assumes that there are three sensitivities based on whether or not the receptor is likely to be exposed to elevated concentrations over a 24-hour period, consistent with the Defra's advice for local air quality management.

With regards to ecological effects, it is advised to seek the advice of an ecologist to determine the need for an assessment of dust impacts on sensitive habitats and plants. Professional judgement is required to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the likely effect and the value of the ecological asset. A habitat may be highly valuable but not sensitive, alternatively it may be less valuable but more sensitive to dust deposition. Consequently, specialist ecological advice should also be sought to determine the sensitivity of the ecological receptors to dust impacts. In general most receptors will either be of high sensitivity or low sensitivity i.e. either sensitive or not to dust deposition.

¹⁴ A vehicle movement is a one way journey. i.e. from A to B, and excludes the return journey.

¹⁵ HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.

Table 7-1 Examples of receptor sensitivities for various construction effects

Receptor sensitivity	Effects		
	Dust soiling	Elevated PM ₁₀	Ecological
High	- Users can reasonably expect a enjoyment of a high level of amenity - The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. - Indicative examples include dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms.	- Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (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). - Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	- Locations with an international or national designation and the designated features may be affected by dust soiling; or - Location where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain - An indicative example is a Special Area of Conservation (SAC) designated for acid heathlands adjacent to the demolition of a large site containing concrete (alkali) buildings or for the presence of lichen.
Medium	- Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or - The appearance, aesthetics or value of their property could be diminished by soiling; or - The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. - Indicative examples include parks and places of work.	- Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM₁₀ (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). - Indicative examples may include office and shop workers, but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation.	- Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or - Locations with a national designation where the features may be affected by dust deposition. - Indicative examples include a Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	- The enjoyment of amenity would not reasonably be expected; or - There is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or - There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. - Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	- Locations where human exposure is transient. - Indicative examples public footpaths, playing fields, parks and shopping streets.	- Locations with a local designation where the features may be affected by dust deposition. - Indicative example is a local Nature Reserve with dust sensitive features.

Additional factors to consider when determining the sensitivity of the area include the following

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and the receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area - and if relevant the season during which the works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and
- Any known specific receptor sensitivities which are considered go beyond the classifications given.

The following tables show how the sensitivity of an area can be determined for the various potential impacts. For each potential impact the highest level of sensitivity should be recorded.

Table 7-2 Sensitivity of the area to dust soiling effects on people and property

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
Low	> 1	Low	Low	Low	Low

Table 7-3 Sensitivity of the area to human health impacts

Receptor sensitivity	Annual mean PM ₁₀ concentration	Number of receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m ³ (>18 µg/m ³ in Scotland)	> 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 (16-18 µg/m ³ in Scotland)	> 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 (14-16 µg/m ³ in Scotland)	> 100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m ³ (<14 µg/m ³ in Scotland)	> 100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low

Receptor sensitivity	Annual mean PM ₁₀ concentration	Number of receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
	Scotland)	1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table 7-4 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

C) Defining the risks of impacts

Dust emission magnitude determined at step A) should be combined with the sensitivity of the area determined at step B) in order to determine the risk of impacts with no mitigation applied. The following matrices provide a method of assigning the level of risk for each activity. For those cases where the risk category is 'negligible', no mitigation measures beyond those required by legislation will be required.

Table 7-5 Risk of dust impacts – demolition

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible

Table 7-6 Risk of dust impacts – earthworks

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table 7-7 Risk of dust impacts – construction

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table 7-8 Risk of dust impacts – trackout

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Low risk	Negligible
Low	Low risk	Low risk	Negligible

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