Government Property Agency

AtkinsRéalis



MANCHESTER DIGITAL CAMPUS

Environmental Statement

Volume 2 - Chapter 7: Air Quality

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Executive Summary

Air quality is a key environmental factor that impacts human health and ecological habitats in many urban areas across the UK. The main local source of air pollution in these areas include Nitrogen Dioxide (NO_2) and Particulate matter (PM_{10} and $PM_{2.5}$) from vehicle exhausts, and dust from demolition and construction activities. The Manchester Digital Campus is located within a designated Air Quality Management Area, indicating already poor levels of air quality in the surrounding areas. Early consideration for the likely effect of the Proposed Development on existing and future air quality is essential to protect the health of local communities and the local environment.

The Air Quality chapter assesses the likely air quality effects of the Manchester Digital Campus on local residents and ecological habitats, including the potential effects of construction dust, and construction and operational vehicle emissions.

This assessment considers the effects of the Proposed Development during both construction and operation phases, as well as the cumulative effects of the Proposed Development in combination with seven other development sites in the surrounding area. The chapter has been prepared in accordance with best practice guidance documents, including those from the Institute of Environmental Management and Assessment (IEMA).

This chapter identified several sensitive groups that could be affected by changes in air quality, including local residents, school children at the Co-op Academy New Islington, patients at the Ancoats Primary Care Centre, and users of the commercial buildings and public amenity areas. Two non-statutory designated ecological sites were also identified within the study area: Rochdale Canal Stott's Lane LWS (immediately adjacent to the north of the Site) and Ashton Canal LWS. However, these sites were not considered sensitive to nitrogen deposition and were therefore scoped out of the vehicle emissions assessment.

During construction, there is a risk of increased dust and vehicle emissions, which could affect local air quality. With appropriate mitigation measures in place, required by legislation and best practice guidance, the potential dust and air quality effects on local residents and ecological habitats during construction are not expected to be significant.

Air quality impacts from construction and operational vehicle emissions are expected to be negligible for the local population and not significant. Overall, once operational, the Proposed Development is not expected to impact the ability to meet annual local air quality targets in future years. The effects on air quality during the construction phase will be controlled through a Construction Environmental Management Plan (CEMP) in accordance with best practice requirements for construction activities.

7. Air Quality

7.1. Introduction

7.1.1. This chapter of the Environmental Statement (ES) assesses the likely effects of the Proposed Development with respect to air quality. It outlines the assessment methodology, describes the existing baseline conditions, identifies potential impacts and provides an assessment of effects. The chapter also details the mitigation measures necessary to prevent, reduce, or offset any significant adverse effects, and discusses the likely residual effects after these measures have been implemented.

7.1.2. This chapter reports on two different types of cumulative effects: intra-project cumulative effects, which are the combined effects of individual topic impacts on a particular sensitive receptor; and inter-project cumulative effects, which consider the way in which the Proposed Development may give rise to impacts in combination with other developments the study area, termed Reasonably Foreseeable Future Projects (RFFPs). The outlined cumulative effects are then used to inform the overall assessment of cross-topic cumulative effects, which is reported in ES (Volume 2) Chapter 22: Cumulative Effects.

7.1.3. This chapter is supported by a technical appendix contained within ES Volume 4 and also by figures contained within ES Volume 5, which includes the following:

- ES (Volume 4) Appendix 7.1 – Air Quality Assessment
- ES (Volume 5) Figure 7.1 – Construction Dust Assessment
- ES (Volume 5) Figure 7.2 – Air Quality Constraints
- ES (Volume 5) Figure 7.3 – Air Quality Operational Phase Modelled Road Network

7.2. Competent expert evidence

7.2.1. This air quality assessment has been undertaken by:

- A Chartered Scientist (BSc, CSci) who holds full professional membership with the Institution of Environmental Sciences and Institute of Air Quality Management. They have over 15 years of knowledge and experience in air quality assessment and have used their knowledge and professional judgement to undertake this assessment.
- An air quality specialist (BSc, MSc) who holds full professional membership with the Institution of Environmental Sciences and Institute of Air Quality Management. They have over 8 years of knowledge and experience in air quality assessment and have used their knowledge and professional judgement to undertake this assessment.

7.3. Relevant legislation and guidance

7.3.1. Table 7-1 below summaries the legislation and regulations applicable to air quality.

Table 7-1 - Legislation and guidance for air quality

Legislation / regulation	Summary of requirements
National	
Environment Act 2021[1]	An Act to make provision about targets, plans and policies for improving the natural environment, including air quality. Schedule 11 amends Part IV of the Environment Act 1995[2] which sets out the responsibility of local authorities for Local Air Quality Management (LAQM), the mechanism by which the Government's Air Quality Strategy (AQS) objectives are to be achieved.
Air Quality Standards Regulations 2010 (Statutory Instrument (SI) 2010 No. 1001)[3] and The Air Quality Standards (Amendment) Regulations 2016 (SI 2016 No. 1184)[4]	The European Union (EU) (Withdrawal Agreement) Act 2020 sets out arrangement for implementing air quality limit values that are included in the EU Directive on ambient air quality and cleaner air for Europe (2008/50/EC) (Air Quality Directive), included in Air Quality Regulations (SI 2010 No.1001) as amended (SI 2016 No.1184). The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (SI 2019 No. 74)[5] and the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (SI 2020 No. 1313)[6] amend the Air Quality Regulations (SI 2010 No.1001) to account for EU withdrawal.
Air Quality (England) Regulations 2000 (SI 2000 No. 928)[7] and Air Quality (England) (Amendment) Regulations 2002 (SI 2002 No.3043)[8]	Sets out the national AQS objectives. Local authorities have a responsibility to review and assess local pollution levels against these objectives.
The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (SI 2023 No.96)[9]	Targets for $PM_{2.5}$ were set by the Government in December 2022, as required by the Environment Act 2021. The targets for $PM_{2.5}$ were legislated on the 31st of January 2023.

[1] UK Parliament (2021) Environment Act 2021 [online]. Available at: Environment Act 2021 (legislation.gov.uk).

[2] UK Parliament (1995) Environment Act 1995 [online]. Available at: Environment Act 1995 (legislation.gov.uk)

[3] Gov.uk (2010) The Air Quality Standards Regulations 2010 [online]. Available at: The Air Quality Standards Regulations 2010 (legislation.gov.uk).

[4] Gov.uk (2016) The Air Quality Standards (Amendment) Regulations 2016 [online]. Available at: The Air Quality Standards (Amendment) Regulations 2016 (legislation.gov.uk).

[5] Gov.uk 'The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019' [online]. Available at: https://www.legislation.gov.uk/uksi/2019/74/made

[6] Gov.uk 'The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (SI 2020 No. 1313)' [online]. Available at: https://www.legislation.gov.uk/uksi/2020/1313/made

[7] Gov.uk (2000) The Air Quality (England) Regulations 2000 [online]. Available at: The Air Quality (England) Regulations 2000 (legislation.gov.uk)

[8] Gov.uk (2002) The Air Quality (England) (Amendment) Regulations 2002 [online]. Available at: The Air Quality (England) (Amendment) Regulations 2002 (legislation.gov.uk)

[9] Gov.uk (2023) The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 [online]. Available at: The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (legislation.gov.uk)

Legislation / regulation	Summary of requirements
National Planning Policy Framework (NPPF) (December 2023)[10]	Provides guidance for local authorities on incorporating air quality considerations into planning decisions and aims to protect the environment and to promote sustainable growth. Paragraphs 109 and 192 relating to sustainable transport and local air quality are most relevant.
Air Quality Strategy (AQS) for England (April 2023)[11]	A framework for the achievement of long-term air quality goals and ambitious new targets for fine particulate matter.
Clean Air Strategy 2019[12]	The Government's Air Quality Strategy sets out how the Government will tackle all sources of air pollution including actions required to meet air quality targets.
Department for Environment Food & Rural Affairs (DEFRA) Environmental Improvement Plan 202313	A 25-year delivery plan to improve the natural environment and work towards long term environmental targets. The air quality delivery plan (within "Goal 2:Clean air") builds on the 2019 Clean Air Strategy and includes interim targets for $PM_{2.5}$ for the year 2028 for both concentration and exposure standards.
Regional	
Greater Manchester Combined Authority (GMCA) (encompassing Stockport and Tameside) Transport Strategy (2040)[14]	The local transport strategy (LTS) details the vision for 2040, focussed on creating an integrated, well-co-ordinated transport system which also supports the Greater Manchester Clean Air Plan. Greater Manchester-wide Policy 9 states that GMCA "will work with partners to bring nitrogen dioxide levels on local roads within legal limits, and to reduce levels of particulate matter, carbon dioxide (CO_2) and noise emissions from vehicles."
5-year Environment Plan for Greater Manchester 2019-2024 (2019)[15]	The 5-year Environment Plan for Greater Manchester sets out the GMCA long term environment vision and includes air quality as one of five key challenges with an aim to "improve air quality, meeting the 2005 World Health Organisation (WHO) guidelines on air quality by 2030 and supporting the UK Government in meeting and maintaining all thresholds for key air pollutants at the earliest date".
Greater Manchester Clean Air Plan[16]	The original Greater Manchester Clean Air Plan (GM CAP) included the introduction of a Greater Manchester-wide category C charging Clean Air Zone, which would have required vans, taxis and private hire vehicles, to meet Euro 6 (diesel) and Euro 4 (petrol) emission standards and minibuses buses, buses, coaches and heavy goods vehicles to meet Euro VI emission standards or pay a daily charge to travel in the zone. Since the coronavirus pandemic, there have been vehicle supply chain issues, particularly for vans, and the cost

[10] Ministry of Housing, Communities & Local Government (2023). National Planning Policy Framework [online]. Available at: National Planning Policy Framework (publishing.service.gov.uk) .

[11] Gov.uk (2023) The air quality strategy for England [online]. Available at: The air quality strategy for England - GOV.UK (www.gov.uk).

[12] Defra (2019) Clean Air Strategy 2019 [online]. Available at: Clean Air Strategy 2019 (publishing.service.gov.uk).

[13] Defra (2023) Environmental Improvement Plan 2023 [online]. Available at: Environmental Improvement Plan (publishing.service.gov.uk).

[14] Greater Manchester Transport Strategy 2040. Available at: Greater Manchester Transport Strategy 2040 | Bee Network | Powered by TfGM

[15] Greater Manchester Combined Authority (2019) 5-year Environment Plan for Greater Manchester 2019-2024. Available at: https://www.greatermanchester-ca.gov.uk/media/1986/5-year-plan-branded_3.pdf

[16] Greater Manchester Clean Air Plan, Clean Air Greater Manchester. Available at: https://cleanairgm.com/clean-air-plans/

Legislation / regulation	Summary of requirements
	of living has increased, meaning that the original GM CAP was thought to be unworkable. In 2023 Greater Manchester local authorities submitted the case for a new GM CAP to the government, with a no charging Clean Air Zone, more investment in electric buses and cleaner taxis, and some traffic management measures in Manchester and Salford.
GMCA Air Quality Action Plan (GMAQAP)[17]	The GMAQAP was developed to promote improvements in air quality related issues in the ten Local Authorities which form part of the GMCA (namely Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford and Wigan). Together with Transport for Greater Manchester (TfGM), GMCA have developed a series of policies and strategies to improve the efficiency of the transport network and access to travel, in order to achieve benefits in terms of air quality.
Greater Manchester Low-Emission Strategy[18]	This 'Low-Emission Strategy' was adopted in 2016. It establishes a framework for developing detailed action plans to reduce carbon emissions and improve air quality up to 2040.
Local	
Manchester's Core Strategy 2012 – 2027[19]	It sets out strategic policies for Manchester's future development and will form the framework against which planning applications will be assessed. It was updated in March 2024, after the Places for Everyone (PfE) joint development plan was adopted. The document sets out current policy (including CC5 transport, EN16 Air Quality (as amended by PfE policy JP-S5) and DM1 Development Management) in terms of air quality.
Places for Everyone Joint Development Plan Document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan[20]	Policy JP-S5 Clean Air amends EN16 Air Quality with: "a comprehensive range of measures will be taken to support improvements in air quality, focusing particularly on locations where people live, where children learn and play, where there are impacts on the green infrastructure network and where air quality targets are not being met".
Guide to Development in Manchester Supplementary Planning Document and Planning Guidance Adopted April 2007[21]	The guidance was adopted in 2007 and is divided into three parts. The first part deals with development principles and has Supplementary Planning Document (SPD) status.

[17] Greater Manchester Air Quality Action Plan. Available at: https://www.greatermanchester-ca.gov.uk/media/1272/air-quality-action-plan-2016-21.pdf

[18] Greater Manchester Low-Emission Strategy. Available at: https://www.greatermanchester-ca.gov.uk/media/1276/low-emission-strategy-dec-2016.pdf

[19] Manchester City Council Core Strategy 2012 – 2027 (2024). Available at: Core Strategy 2012-2027 | Core Strategy 2012-2027 | Manchester City Council

[20] Places For Everyone Joint Development Plan Document For Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford And Wigan (2022 to 2039). Available at: Places for Everyone Joint Development Plan Document (greatermanchester-ca.gov.uk)

[21] Guide to Development in Manchester - Supplementary Planning Document and guidance. Available at: https://www.manchester.gov.uk/downloads/download/644/guide_to_development_in_manchester_-_supplementary_planning_document_and_planning_guidance_spd

Legislation / regulation	Summary of requirements
	The second part provides additional guidance on the character of various areas within the city. Part three of the Guide to Development explains how it should be used and how it relates to the wider planning policy framework, development control, Local Transport Plan, Community Strategy, and Housing Market Renewal Pathfinder. Paragraph 4.14 under Construction Management makes reference to air quality.
Manchester City Council: Air Quality & Planning Guidance[22]	This document provides air quality advice and guidance for developers in order that new development may achieve high standards and not compromise the health of the population living and working in Manchester. This includes refence to published methodologies of the Institute of Air Quality Management (IAQM) / EPUK Land Use Planning Guidance and IAQM Dust Guidance and the use of DEFRA's 'damage cost' calculations (for additional pollutant population exposure emissions costs) for major developments and/or where there may be a cumulative impact.

7.3.2. Table 7-2 below summarises the Technical Standards and Guidance applicable to air quality.

Table 7-2 - Technical standard and guidance for air quality

Technical standards / guidance	Summary of requirements
Planning Practice Guidance (PPG)[23]	Intended to support the NPPF and provide further context. Paragraph 005 of the air quality guidance (Reference ID: 32-005-20191101) provides information relating to air quality that could be important to decision makers.
DEFRA's Local Air Quality Management (LAQM) Technical Guidance 2022 (TG.22)[24]	Provides relevant methods concerning treatment and interpretation of data in relation to the fulfilment of duties under the LAQM regime but is frequently applied when undertaking air quality assessments for planning applications.
Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) 'Land-use Planning and Development Control: Planning for Air Quality' (IAQM Planning Guidance)[25]	Ensures that air quality is adequately considered in the land-use planning and development control processes. It provides screening Criteria for assessment, a framework for describing the magnitude of changes in pollutant concentrations at receptors and gives advice on how overall significance may be assessed using professional judgement.

[22] Manchester City Council, Air Quality & Planning Technical Guidance. Available at: https://www.manchester.gov.uk/download/downloads/id/28690/air_quality_and_planning_guidance.pdf

[23] Gov.uk (2019) Guidance – Air Quality [online]. Available at: Air quality - GOV.UK (www.gov.uk).

[24] Defra (2022) Local Air Quality Management Technical Guidance (TG.22)'[online]. Available at: LAQM-TG22-August-22-v1.0.pdf (defra.gov.uk)

[25] EPUK and IAQM (2017) Land-Use Planning & Development Control: Planning for Air Quality [online] Available at: air-quality-planning-guidance.pdf (iaqm.co.uk).

Technical standards / guidance	Summary of requirements
IAQM 'Guidance on the assessment of dust from demolition and construction.' (IAQM Construction Dust Guidance)[26]	Guidance and methodology updated in January 2024. Provides a framework for a risk-based approach to the assessment of dust emissions from demolition and construction land development schemes and outlines options for mitigation depending on the level of 'dust risk' identified.
IAQM 'A guide to the assessment of air quality impacts on designated nature conservation sites 2020.' (IAQM Conservation Site Guidance.)[27]	Guidance the assessment of the air quality impacts of development on designated nature conservation sites.

Local air pollutants

7.3.3. In most urban areas in the UK, the main local source of air pollution is road traffic, although there are growing contributions of particulates from other sources such as construction and domestic combustion. Emissions from vehicle exhausts contain a complex mixture of pollutants including of key concern, oxides of nitrogen (a mixture of nitrogen dioxide and nitric oxide – dominated by the latter) and particulate matter (PM). The quantities of each pollutant emitted depend upon the vehicle type, quantity and type of fuel used, engine size, speed of the vehicle and abatement equipment fitted.

Nitrogen dioxide

7.3.4. Nitrogen dioxide (NO_2) is a secondary pollutant produced by the oxidation of nitric oxide (NO) in ambient air. The pollutants NO and NO_2 are collectively termed oxides of nitrogen (NO_x). Approximately 30 percent of UK NO_x emissions are from road transport, while a fifth are from other forms of transport[28]. The majority of NO_x emitted from vehicles is in the form of NO, which oxidises rapidly in the presence of ozone (O_3) to form NO_2. In high concentrations NO_2 can affect the respiratory system, whereas NO does not have any observable effect on human health at the range of concentrations found in ambient air. High concentrations of NO_x can have an adverse effect on vegetation, including leaf or needle damage and reduced growth. Deposition of pollutants derived from NO_x emissions contribute to acidification and/or eutrophication of sensitive habitats.

Particulate matter

7.3.5. Particles with an effective aerodynamic diameter of less than 10 micrometres (µm) are referred to as PM_{10}. Primary PM_{10} emissions in the UK are derived from combustion sources including road transport, from quarrying and construction activities, and from wind-blown dust. Diesel engines produce the majority of particulate emissions from the vehicle fleet. Approximately 16 percent of PM_{10} emissions in the UK are derived from road transport[29]. Particulate matter is associated with a range of symptoms of ill health including effects on the respiratory and cardiovascular systems, on asthma and on mortality. There is evidence that exposure to a finer fraction of particles ($PM_{2.5}$ particles with a diameter of less

[26] IAQM (2024) Guidance on the assessment of dust from demolition and constructionV2.2 [online]. Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf

[27] IAQM (2020) A guide to the assessment of air quality impacts on designated nature conservation sites. Version 1.1[online]. Available at: air-quality-impacts-on-nature-sites-2020.pdf

[28] National Atmospheric Emissions Inventory (NAEI) 'About Nitrogen Oxides' Available at: Nitrogen Oxides | National Atmospheric Emissions Inventory

[29] NAEI 'About PM10 (Particulate Matter < 10µm)' Available at: PM10 (Particulate Matter < 10µm) | National Atmospheric Emissions Inventory

than 2.5 µm, which typically make up around two thirds of PM_{10} emissions and concentrations) has a significant contributory role in human all-cause mortality and in particular in cardiopulmonary mortality[30].

Dust

7.3.6. Dust is defined within the Institute of Air Quality Management (IAQM)'s "Guidance on the assessment of dust from demolition and construction" (IAQM Dust Guidance)[31] as solid particles that are suspended in air or that have settled out onto a surface after having been suspended in air. It includes particles that give rise to soiling (deposited dust) and to human health and ecological effects.

7.3.7. The IAQM Dust Guidance states that there is evidence that, without effective mitigation, major construction sites can lead to an increase in annual mean PM_{10} concentrations and the number of exceedances of the short-term 24-hour objective for PM_{10}. In addition, construction activities have the potential to cause higher than normal levels of dust deposition in the surrounding area. Dust emissions from a construction site may be mechanically generated due to land preparation (e.g., demolition, land clearing and earth moving) or released from site plant and from the movement of road vehicles on temporary roads, open ground and haul routes.

Air quality criteria

7.3.8. Table 7-3 below summaries the relevant air quality criteria for the protection of human health and vegetation.

Table 7-3 Statutory air quality criteria for relevant air pollutants

Pollutant	Criteria	
NO_2	Limit value and objective	Hourly mean concentration should not exceed 200 µg/m^3 more than 18 times a year. Annual mean concentration should not exceed 40 µg/m^3.
PM_{10}	Limit value and objective	24-hour mean concentration should not exceed 50 µg/m^3 more than 35 times a year. Annual mean concentration should not exceed 40 µg/m^3.
$PM_{2.5}$*	Limit value	Annual mean concentration should not exceed 20 µg/m^3 by 2020 (Stage 2 Limit). Exposure reduction: target of 20% reduction in concentrations at urban background between 2010 and 2020.
	Objective	UK (except Scotland) annual mean concentration should not exceed 20 µg/m^3 by 2020.
	Target	Annual mean concentration target – a maximum of 10 µg/m³ to be met across England by 2040, with an interim target of 12 µg/m³ by the end of January 2027. Population exposure reduction target – a 35% reduction in population exposure by 2040 (compared to the base year of 2018), with an interim target to reduce by 22% by the end of January 2027.

[30] Air Quality Expert Group (AQEG) Fine Particulate Matter ($PM_{2.5}$) in the UK (2012). Available at: https://uk-air.defra.gov.uk/assets/documents/reports/cat11/1212141150_AQEG_Fine_Particulate_Matter_in_the_UK.pdf

[31] IAQM (2024) 'Guidance on the assessment of dust from demolition and construction'. Available at: Construction-Dust-Guidance-Jan-2024.pdf (iaqm.co.uk)

*Regulation SI 2023 No.96 sets out that the targets for $PM_{2.5}$ are to apply at relevant monitoring locations which are considered to be fixed monitoring locations with the national monitoring network. However, for this air quality assessment these targets have been applied at all locations on a precautionary basis.

Dust

7.3.9. There are no national standards or guidelines for dust deposition currently set in the UK, or by any international organisation. This is mainly due to the difficulty that any standard set would need to relate to dust being a perceptual problem rather than being specifically related to health effects. A threshold of 200 mg/m^2/day is recommended as a level for action by the IAQM[32].

International guidelines

7.3.10. The World Bank advises that, in the long-term, countries should seek to meet standards for ambient air quality as set out in World Health Organisation (WHO) guidelines. WHO published air quality guidelines in 2005[33], with an update published in 2021[34]. The WHO guidelines for NO_2, PM_{10} and $PM_{2.5}$ are presented in Table 7-4 . The WHO air quality guidelines for 2005 had tighter standards for PM_{10} and $PM_{2.5}$ than UK statutory air quality criteria. The 2021 WHO guidelines further tighten standards for PM_{10} and $PM_{2.5}$ and also for NO_2. GMCA has a commitment to meeting the 2005 WHO air quality guidelines by 2030.

Table 7-4 World Health Organisation air quality guidelines for relevant air pollutants

Pollutant	WHO Guideline 2005	WHO Guideline 2021
NO_2	Hourly mean concentration should not exceed 200 µg/m^3. Annual mean concentration should not exceed 40 µg/m^3.	24-hour mean concentration should not exceed 25 µg/m^3. Annual mean concentration should not exceed 10 µg/m^3.
PM_{10}	24-hour mean concentration should not exceed 50 µg/m^3. Annual mean concentration should not exceed 20 µg/m^3.	24-hour mean concentration should not exceed 45 µg/m^3. Annual mean concentration should not exceed 15 µg/m^3.
$PM_{2.5}$	24-hour mean concentration should not exceed 25 µg/m^3. Annual mean concentration should not exceed 10 µg/m^3.	24-hour mean concentration should not exceed 15 µg/m^3. Annual mean concentration should not exceed 5 µg/m^3.
The 24-hour mean is based on a 99th percentile with 3-4 allowable exceedance per year.		

[32] IAQM (2018) Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites. Available online at: https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf

[33] World Health Organisation, 2005, Air Quality Guidelines: Global Update 2005: Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide. Available at: https://apps.who.int/iris/handle/10665/107823

[34] World Health Organisation, 2021, Air Quality Guidelines: Global Update 2021: Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide and Carbon Monoxide. Available at: https://apps.who.int/iris/handle/10665/345329

7.4. Assessment methodology

Study area

7.4.1. For the potential effects of construction dust, the study area was defined in accordance with IAQM Construction Dust Guidance and is shown on ES (Volume 5) Figure 7.1:

- For human receptors, the area within 250 m of construction activity and/or within 50 m of the route(s) used by construction vehicles on the public highway up to 250 m from the Site entrance(s).
- For ecological receptors, the assessment area is defined as the area within 50 m of construction activity and/or within 50 m of the route(s) used by construction vehicles on the public highway up to 250 m from the Site entrance(s).

7.4.2. For the potential effects of traffic emissions during the construction phase, the study area for both human health and ecological receptors is within 200 m of the Affected Road Network (ARN), which is defined as roads meeting the traffic scoping criteria within the IAQM Planning Guidance. The relevant traffic change criteria are:

- A change of light duty vehicles (LDV) of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA), or 500 Traffic AADT elsewhere;
- A change of HDV of more than 25 AADT within or adjacent to an AQMA, or 100 AADT elsewhere.
- A change of 5 m or more in road alignment and the road is within an AQMA.

7.4.3. The need for an assessment of operational impacts associated with the Proposed Development and the study area extent has been determined using the screening criteria given in the IAQM Planning Guidance. The IAQM Planning Guidance screening criteria indicate an air quality assessment is required if the development comprises:

- 10 or more residential units or a site area of more than 0.5 ha; or
- More than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha; and either:
- More than 10 parking spaces; or
- A centralised energy facility or other centralised combustion process.

7.4.4. Given that the Proposed Development would deliver more than 1,000 m^2 of floor space and more than 10 parking spaces, the indicative traffic change criteria in the IAQM Planning Guidance (provided above) were reviewed to determine whether further assessment was required. The study area for both human health and ecological receptors is within 200 m of the ARN, as defined as roads meeting the traffic scoping criteria within the IAQM Planning Guidance.

7.4.5. Traffic data for the operational phase have been provided by AtkinsRéalis Transportation team for the following scenarios:

- Base year (2022) to allow for the verification of the dispersion model against local monitoring data (see ES (Volume 4) Appendix 7.1)
- Fully operational opening year (2030) without the Proposed Development (without Proposed Development scenario)
- Fully operational opening year (2030) with the Proposed Development (with Proposed Development scenario)

7.4.6. Changes in traffic flows associated with the operation of the Proposed Development were calculated for the road links for which traffic data were provided. Sections of A665 Great Ancoats Street between Oldham Road and Every Street, A62 Oldham Road, Store Street, Adair Street, Addington Street, Corporation Street, Angel Street and A664 Corporation Street exceed the traffic screening criteria for locations within an AQMA (details of AQMA are provided in Section 7.5 Baseline conditions) and have therefore been included in the air quality assessment study area. The traffic data are presented in Table 7.6 in ES (Volume 4) Appendix 7.1 and the roads meeting the IAQM Planning Guidance traffic screening criteria are shown on ES (Volume 5) Figure 7.3.

7.4.7. The IAQM Planning Guidance also requires assessment of underground car parks where there are more than 100 movements per day combined with ventilation extraction located within 20 m of a sensitive receptor. The Proposed Development includes an underground car park (50 disabled parking spaces) with extraction system. There are expected to be more than 100 movements into the car park per day (390 AADT), however, the ventilation extract for the car park will not be within 20 m of a relevant sensitive receptor (for the vent locations see the Landscape / Public Realm Masterplan[35]). Therefore, further assessment of emissions from the underground car park has been scoped out.

Sensitive receptors

7.4.8. Human health and ecological receptors that may be affected by the Proposed Development have been identified in accordance with definitions provided in the IAQM Planning Guidance, IAQM Conservation Site Guidance and IAQM Construction Dust Guidance.

7.4.9. Sensitive human health receptors for the purposes of air quality assessment include residential properties, locations of susceptible populations e.g., schools, hospitals and care homes for the elderly, or any other location where a member of the public may be exposed to an air pollutant for the relevant exposure time period. See paragraph 7.5.19 for details of sensitive human health receptors within the study area.

7.4.10. Designated nature conservation sites may contain features that are sensitive to increased concentrations of airborne pollutants and dust. IAQM Conservation Site Guidance requires assessment of air quality effects on Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) and areas of Ancient Woodland (AW) within 200 m of any road affected by the Proposed Development.

7.4.11. There are no statutory designated ecological receptors sensitive to air quality (nitrogen deposition) or dust deposition within the study area. As such statutory designated ecological receptors have not been considered further in the assessment of construction and operational vehicle emissions.

7.4.12. The Greater Manchester Sites of Biological Importance (SBI), which are considered to be a non-statutory LWS designation, include the Rochdale Canal Stott's Lane and Ashton Canal sites, located within 20 m and 190m of the Site boundary respectively. These sites are considered to be low sensitivity to dust soiling and are included within the construction dust assessment. These sites are aquatic urban canals with limited vegetation and therefore are not considered sensitive to air quality (nitrogen deposition). As such, the LWSs and SBIs have not been considered in the assessment of construction and operational vehicle emissions.

[35]Landscape / Public Realm Masterplan document reference MDCX-ATR-ZZ-ZZ-DR-L-231000-Public realm masterplan.pdf

Methodology

Sources of baseline information

7.4.13. Information on existing air quality conditions and constraints within the study area was obtained from the following sources:

- Information on Local Air Quality Management (LAQM) including AQMA and air quality monitoring data from the latest Air Quality Annual Status Report (ASR)[36]
- Monitoring data available from the Air Quality in England website[37] and the Clean Air Greater Manchester website[38]
- AQMA mapping[39] and
- Background pollutant concentrations and Pollution Climate Mapping (PCM)[40] modelling data from DEFRA's UK Air Quality Information Resource (UK-AIR)[41].

7.4.14. The following sources have been used to identify receptors and potential constraints:

- OpenStreetMap for mapping[42]
- DEFRA Multi–Agency Geographic Information for the Countryside (MAGIC) website[43] to identify boundaries of designated ecological sites.
- Sites of Biological Importance (SBIs) in Greater Manchester[44] to identify boundaries of non-statutory LWS.

7.4.15. A constraints map showing the air quality study area and baseline data is shown in ES (Volume 5) Figure 7.2.

Construction dust

7.4.16. The IAQM Construction Dust Guidance provides a framework for a risk-based approach to the assessment of dust emissions from demolition and construction. The assessment of dust emissions during construction of the Proposed Development is considered in the context of the overall scale and nature of the development under consideration and the potential sensitivity of neighbouring land uses. The quantity and distribution of dust emissions varies according to type, duration and location of activity, weather conditions and the effectiveness of suppression (mitigation) measures. Good practice control measures that are "highly recommended" or "desirable" for dust control for various dust risk categories are recommended. The construction dust assessment methodology including the classification of sensitivity and magnitude of effect is provided in ES (Volume 4) Appendix 7.1.

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[36] GMCA (2022) '2023 Air Quality Annual Status Report (ASR)'. Available at: https://cleanairgm.com/data-hub/monitoring-reports/

[37] Monitoring data from Air Quality in England website. Available at: https://www.airqualityengland.co.uk/about

[38] Monitoring data from Clean Air Greater Manchester website. Available at: https://cleanairgm.com/

[39] Defra AQMA interactive map. Available at: AQMAs interactive map

[40] Defra UK-AIR 'Air pollution forecast'. Available at: https://uk-air.defra.gov.uk/

[41] The latest available version at the time the modelling was undertaken in Septermber / October 2024: Defra background maps. Available at: Background Mapping data for local authorities - 2018 - Defra, UK

[42] OpenStreetMap. Available at: https://www.openstreetmap.org

[43] Magic.Defra.gov.uk. Magic Map Application. Available at: https://magic.defra.gov.uk/MagicMap.aspx

[44] Data.gov.uk, April 2023, 'Sites of Biological Importance (SBI / LWS) in Greater Manchester'. Available at: https://www.data.gov.uk/dataset/81cbf1a0-6304-470c-ade8-60272be0d219/sites-of-biological-importance-sbi-lws-in-greater-manchester

Construction and operational vehicle emissions

7.4.17. The potential impact of construction and operational vehicle emissions on air quality has been evaluated using criteria given in the IAQM Planning Guidance (see paragraph 7.4.2 above). It is necessary to undertake assessment where the thresholds in paragraph 7.4.2 are exceeded due to changes in traffic flows.

7.4.18. The effect of construction traffic during the construction phase of the Proposed Development has been considered with reference to the duration of construction works and the expected volume of construction vehicles. Information on the number of construction vehicles associated with the Proposed Development has been provided by Government Property Agency (GPA). The expected numbers of construction vehicle movements were screened against the relevant criteria (see paragraph 7.4.2) and further qualitative consideration of construction phase traffic impacts has been undertaken. Summary data of expected construction traffic during the Proposed Development construction works is presented in ES (Volume 4) Appendix 7.1 Table 1.14.

7.4.19. During operation, the traffic flow changes are anticipated to be above the relevant criteria (see paragraph 7.4.6), and therefore a quantitative assessment using the air dispersion model ADMS Roads has been undertaken. The methodology for the dispersion modelling is provided in ES (Volume 4) Appendix 7.1.

Sensitivity of receptors

7.4.20. When assessing the potential impact of vehicle emissions on air quality a receptor is considered to be sensitive where a location is representative of human or ecological exposure to a pollutant, over a time period relevant to the air quality criteria that is being assessed against. A level of sensitivity based on criteria and/or thresholds is not used within assessment guidance for determining the potential impact of vehicle emissions on air quality and receptors are considered to have equal sensitivity.

Magnitude of impact

7.4.21. The magnitude of impact is based on the consequences that the Proposed Development would have on the sensitive human health receptors. The criteria for the assessment of magnitude of impact on human health receptors are shown in Table 7-5 based on the change in concentration. The change in concentration due to the Proposed Development is classified according to the percentage change relative to the Air Quality Assessment Level (AQAL) of interest.

Table 7-5 - IAQM air quality impact descriptors for individual receptors

Long-term average concentration at receptor	Percentage change in concentration relative 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

Significance of effect

7.4.22. The classification of the significance of effect is judged based on the magnitude of impact to the assessed sensitivity of the receptors. These effects may be adverse (negative) or beneficial (positive). The overall determination of significance of effect requires the professional judgement of a suitably

qualified air quality professional and a clear statement and rationale is provided as to whether the effect is 'significant' or 'not significant'. This judgement must take into account such factors as:

- The existing and future air quality in the absence of the scheme or development;
- The extent of current and future population exposure to the impacts (i.e., extrapolating the findings from the individual modelled receptors); and
- The influence and validity of any assumptions adopted when modelling the impacts.

Damage cost calculations

7.4.23. Manchester City Council's "Air Quality & Planning Guidance" requires the calculation of a "damage cost" to provide an estimate of the financial commitment required to offset any increased air pollutant emissions due to developments. The calculation uses Defra's 'damage cost' approach. The calculation is based on:

- Determination of additional trip rates and average distance travelled.
- Calculation of additional emissions of NOx and PM_{10} using the Defra Emission Factor Toolkit.
- Calculation of emissions over 5 years from the expected opening year.
- Use of HM Treasury and Defra Interdepartmental Group on Costs and Benefit (IGCB) damage cost approach to provide a valuation of the excess emissions.

7.4.24. The resulting valuation is the financial commitment required for offsetting emissions, such as providing contributions to car clubs, low emission vehicle refuelling infrastructure (e.g. electric vehicle charging), low emission public transport options and cycling and walking infrastructure.

Cumulative effects

7.4.25. The intra-project effects assessment draws from the residual air quality effects set out in this chapter. Intra-project cumulative effects text is also set out in Chapter 22: Cumulative Effects.

7.4.26. The RFFPs expected to have concurrent construction activities are considered further in the inter-project effects assessment for air quality during the construction phase. The inter-project cumulative effects for the operational phase are presented in this chapter.

Assumptions and limitations

7.4.27. Limitations regarding the availability of construction phase specifics (such as proposed construction methods, peak daily HDV movements and specific plant) mean that assumptions based on previous experience of similar projects have been used to inform a high-level indicative construction dust assessment at this stage (relevant assumptions in line with the IAQM Dust Guidance are provided in Table 7-24).

7.4.28. The assessment of the operational phase is based on the following key inputs and assumptions:

- Traffic data for the air dispersion modelling, has been forecast using TEMPro growth factors by AtkinsRéalis Transportation team to produce estimated flows for base year 2022 (as required for dispersion model verification), and the without and with the Proposed Development scenarios in 2030. (See ES (Volume 2) Chapter 18: Traffic and Transport for further assumptions and limitations of the traffic data).
- Meteorological data used in the air dispersion modelling is for a recent year, with the limiting assumption that conditions in the future will be the same as in the past.
- Further details of inputs, assumptions and uncertainty for the air dispersion modelling is presented in ES (Volume 4) Appendix 7.1.

Consultation

7.4.29. MCC have been consulted through pre-application and provided advice in response to the Scoping Report (ES (Volume 4) Appendix 4.1) which has informed the approach to the assessment reported in this ES. No issues were raised by MCC.

7.5. Baseline conditions

Local air quality management

7.5.1. The Proposed Development is located within the Greater Manchester AQMA. This AQMA was declared in 2016 due to exceedances of the annual mean air quality objective for NO_2 and encompasses Manchester City Centre, the area around Manchester Airport and the main arterial traffic routes in the city. The AQMA is shown in ES (Volume 5) Figure 7.2.

Air quality monitoring

7.5.2. Air quality monitoring is undertaken by national and local authorities and is a key component of LAQM. Measurements of pollutant concentrations include analytical instruments that measure continuously, and passive sampling devices such as diffusion tubes which give longer period results (typically monthly, to calculate an annual mean concentration).

Continuous monitoring

7.5.3. Manchester City Council conducts automatic (continuous) monitoring at 3 locations, however none of these monitors are within the study area. The closest of these monitoring sites is at Manchester Piccadilly, an 'urban centre' monitoring site (MAN3), approximately 650 m to north of the Site. This monitoring site can be considered relatively representative of the Site.

7.5.4. Measured annual mean NO_2 concentrations for this site for the period 2019 to 2023 is presented in Table 7-6.The monitoring data indicates that concentrations of NO_2 remained below the annual mean objective (40 µg/m^3) at the urban centre Manchester Piccadilly site between 2019 and 2023. There were no exceedances of the 1-hour mean NO_2 objective at the urban centre Manchester Piccadilly site between 2019 and 2023.

7.5.5. Note, the 2020 data, and to a lesser extent the 2021 data presented herein are likely to have been lower than expected due to the COVID-19 pandemic affecting traffic levels.

Table 7-6 - Annual mean NO_2 concentrations at continuous monitoring sites (µg/m^3), 2018–2023

Site ID	Site Type	X, Y	2018	2019	2020	2021	2022	2023
Manchester Piccadilly	Urban Centre	384310, 398337	35	36	27	30	29	27

7.5.6. Measured annual mean PM_{10} concentrations for the years 2019 to 2023 at Manchester Piccadilly site are presented in Table 7-7 and the number of exceedances of the 24-hour mean PM_{10} standard are shown in Table 7-8. Concentrations at both monitoring sites were below both the annual mean objective for PM_{10} (40 µg/m^3) and the 24-hour mean objective (50 µg/m^3 not to be exceeded more than 35 times per year) in all years.

Table 7-7 - Annual mean PM_{10} concentrations at continuous monitoring sites (µg/m^3), 2018–2023

Site ID	Site Type	X, Y	2018	2019	2020	2021	2022	2023
Manchester Piccadilly	Urban Centre	384310, 398337	21	20	15	15	17	15

Table 7-8 - Number of exceedances of the 24-hour mean PM_{10} objective, 2018–2023

Site ID	Site Type	X, Y	2018	2019	2020	2021	2022	2023
Manchester Piccadilly	Urban Centre	384310, 398337	2	7	1	2	4	1

7.5.7. Table 7-9 presents the annual mean $PM_{2.5}$ concentrations for the years 2019 to 2023 at Manchester Piccadilly. In all years, the annual mean $PM_{2.5}$ concentrations were below the current objective of 20 µg/m^3, and at or below the new interim target of 12 µg/m^3 to be met by January 2028. In years 2020 to 2023 annual mean concentrations also met or were below the target of 10 µg/m^3 to be met by 2040.

Table 7-9 - Annual mean $PM_{2.5}$ concentrations at continuous monitoring sites (µg/m^3), 2018–2023

Site ID	Site Type	X, Y	2018	2019	2020	2021	2022	2023
Manchester Piccadilly	Urban Centre	384310, 398337	11	12	8	9	10	9

Passive monitoring

LAQM and Clean Air Plan monitoring

7.5.8. Passive monitoring of NO_2 concentrations using diffusion tubes is undertaken at 391 locations across GMCA as part of LAQM responsibilities, two of which are within the vicinity of the study area. GMCA LAQM monitoring site locations are shown in ES (Volume 5) Figure 7.2 and data for 2018 to 2023 are provided in Table 7-10. The results show the annual mean AQS objective for NO_2 was met at both LAQM monitoring sites operated by Manchester City Council between 2020 and 2023.

7.5.9. Note, the 2020 data, and to a lesser extent the 2021 data presented herein are likely to have been lower than expected due to the COVID-19 pandemic affecting traffic levels.

Table 7-10 - Annual mean NO_2 concentrations of diffusion tubes (µg/m^3)

Site ID	Site Type	X, Y	2018	2019	2020	2021	2022	2023
MA71NO	Roadside	385161, 398290	**46.1**	**45.3**	31.4	34.2	34.4	30.7
MA88NO	Kerbside	384469, 398981	**46.8**	**45.2**	30.1	36.8	35.7	32.7

7.5.10. GMCA also carries out air quality monitoring for the purposes of the Greater Manchester Clean Air Plan (CAP) at 293 locations. Nineteen CAP monitoring sites are located within the study area. CAP monitoring site locations are shown in ES (Volume 5) Figure 7.2 and data for 2019 to 2023 are provided in Table 7-11.

7.5.11. The majority of the CAP sites in the study area monitored concentrations above the annual mean AQS objective for NO_2 in 2023. It should be noted that while classed as 'roadside' locations, many of these monitors are located within 1 m of the kerb (kerbside), as such, high concentrations are to be expected. These locations are specifically for assessing the compliance with limit values which apply anywhere with public access rather than AQS objectives, which are considered for LAQM purposes, and which apply where public are likely to be exposed for the relevant time period. Sites exceeding the annual mean AQS NO_2 objective are located within the pavement and are therefore not considered to be representative locations of relevant exposure for the annual mean AQS objective.

7.5.12. Note, the 2020 data, and to a lesser extent the 2021 data presented herein are likely to have been lower than expected due to the COVID-19 pandemic affecting traffic levels.

Table 7-11 - Annual mean NO_2 concentrations of Clean Air Plan monitoring diffusion tubes (µg/m^3)

Site ID	Site Type	X, Y	2019	2020	2021	2022	2023
CAP_MANC_001	Roadside	384744,398594	-	**44.2**	**46.6**	**50.9**	**49.3**
CAP_MANC_012	Roadside	384980,398407	-	38.9	**42.9**	38.5	36.7
CAP_MANC_013	Roadside	384995,398363	**54.1**	34.5	**40.8**	**51.2**	**48.2**
CAP_MANC_014	Roadside	384837,398538	**61.6**	35.1	**40.0**	**43.0**	39.5
CAP_MANC_015	Roadside	384757,398618	-	36.4	**43.0**	**51.4**	**44.1**
CAP_MANC_051	Roadside	384104,399128	-	**40.1**	**54.4**	**50.2**	-
CAP_MANC_052	Roadside	384396,398811	**66.3**	**40.2**	**44.4**	**45.6**	**44.0**
CAP_MANC_064	Roadside	384329,398777	**64.6**	**43.7**	**49.2**	**59.4**	**58.6**
CAP_MANC_076	Roadside	384214,399005	**47.1**	26.4	-	29.5	27.3
CAP_MANC_077	Roadside	384351,398915	**44.1**	26.6	30.6	32.2	29.1
CAP_MANC_078	Roadside	384490,398812	**57.1**	32.9	37.2	**40.6**	36.9
CAP_MANC_079	Roadside	384543,398770	**66.3**	36.2	**42.0**	**44.3**	**42.3**
CAP_MANC_089	Roadside	384649,398545	**50.7**	29.5	31.6	31.2	30.4
CAP_MANC_136	Roadside	384086,399158	-	-	-	**44.1**	-
CAP_MANC_137	Roadside	384140,399102	-	-	-	**46.9**	**43.6**
CAP_MANC_141	Roadside	384603,398720	-	-	-	**45.8**	**43.1**
CAP_MANC_142	Roadside	384527,398798	-	-	-	39.1	38.3
CAP_MANC_143	Roadside	384405,398840	-	-	-	**43.2**	**40.6**
CAP_MANC_144	Roadside	384427,398833	-	-	-	**41.9**	**42.3**
CAP_MANC_162	Roadside	384068, 398797	-	-	-	**48.1**	**48.8**
CAP_MANC_163	Roadside	384060,398770	-	-	-	**44.7**	-

AtkinsRéalis monitoring

7.5.13. A site-specific passive diffusion tube survey was undertaken for 6 months by AtkinsRéalis between the 5th October 2022 and 5th April 2023. The diffusion tubes, each monitored in triplicate, were placed on

available street furniture (e.g. lampposts / telegraph poles) at approximate heights between 2.1 m and 2.4 m. Three of the survey locations were within the Site boundary and three were at roadside locations; two on the A665 Great Ancoats Street immediately south of the Site and one on Old Mill Street east of the Site. The results are provided in Table 7-12 and show that the annual mean AQS objective for NO_2 was met at all the survey locations. The AtkinsRéalis survey locations are shown on ES (Volume 5) Figure 7.2.

Table 7-12 - Annual mean NO_2 concentrations of diffusion tubes (DT) (µg/m^3)

Site ID	Site Type	X, Y	Annualised and bias adjusted concentrations 2022 (time weighted)^*
DT1	Roadside	385081,398374	26.4
DT2	Roadside	385001,398400	27.2
DT3	Roadside	385138,398315	26.5
DT4	Roadside	385224,398286	26.4
DT5	Roadside	385131,398311	28.7
DT6	Roadside	384981,398409	33.6

^Note: Annualisation factor of 0.85 and bias adjustment factor of 0.87 are applied to the period average for each site.

*Note: As the time of each monthly sample was not constant, a time weighted average was calculated as per Defra's TG.22 guidance

DEFRA mapped concentrations

7.5.14. Estimates of current and future year background pollutant concentrations in the UK are available on the DEFRA UK-AIR website[41]. The background estimates, which are compiled from a combination of measured and modelled data, are available for each one-kilometre grid square throughout the UK for a base year of 2018 and future year estimates up to 2030. These background estimates include contributions from all source sectors, e.g., road transport, industry and domestic and commercial heating systems.

7.5.15. Estimated annual mean background concentrations for the one-kilometre grid squares that covers the study area for the baseline year of 2022 and future year of 2030, are presented in Table 7-13. The mapped data indicate that background concentrations in the air quality study area are well below relevant AQS objectives and the interim target of 12µg/m^3 for $PM_{2.5}$[45]. Background concentrations of $PM_{2.5}$ are also expected to be below the 2040 target of 10 µg/m^3.

Table 7-13 - DEFRA mapped background annual mean concentrations for 2022 and 2030 (µg/m^3)

Grid Square (x, y)	2022 Background concentration (µg/m^3) *			2030 Background concentration (µg/m^3) *		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
383500_399500	19.0	11.9	7.8	15.7	11.5	7.5
384500_397500	24.7	13.8	8.7	20.3	13.4	8.4

[45] IAQM defines 'well below' as: exposure less than 75% of the Air Quality Assessment Level (AQAL) i.e., well below, the degree of harm is likely to be small. AQAL encompasses AQS objectives, Limit Values and Targets.

Grid Square (x, y)	2022 Background concentration (µg/m³) *			2030 Background concentration (µg/m³) *		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
384500_398500	26.3	13.0	8.4	22.3	12.6	8.1
384500_399500	19.6	12.0	7.9	16.2	11.6	7.6
385500_397500	21.7	12.6	8.2	17.9	12.2	7.9
385500_398500	20.9	12.0	8.0	17.5	11.6	7.7

* Total background concentration without application of sector removal tool.

Pollution climate mapping

7.5.16. DEFRA's pollution climate mapping (PCM) model provides estimates of roadside concentrations of annual mean NO_2, which are used in reporting regarding compliance with limit values. The model provides projected roadside concentrations for the years 2018 to 2030 inclusive, based on a 2018 reference year.

7.5.17. There are a number of PCM links within the study area as shown in Table 7-14. All the annual mean roadside NO_2 concentrations on PCM road links show compliance with the air quality limit value in the base year (2022) and opening year (2030) with a maximum modelled roadside annual mean NO_2 concentration of 22.3 µg/m³ in 2030, therefore there is not a risk of exceeding the annual mean NO_2 limit value based on the PCM model data.

Table 7-14 - PCM links annual mean NO_2 concentrations for 2022 and 2030 (µg/m³)

Census ID	Road Name	2022	2030
802007857	A665	30.4	21.5
802008563	A62	27.7	22.3
802017822	A6042	29.3	20.6
802047457	A665	29.6	21.1
802048035	A6042	26.3	22.3
802056492	A62	26.3	19.0
802057427	A664	27.6	22.3
802070155	A62	26.3	22.3
802075246	A665	28.8	22.3

Summary of existing conditions

7.5.18. The Proposed Development is located within the Greater Manchester AQMA. Monitoring data has shown annual mean NO_2 AQS objectives have been exceeded at several roadside locations in the study area, however these sites are located on the pavement and not considered to be representative of relevant exposure for the annual mean AQS objective (i.e. the public are unlikely to be exposed for the applicable time period). DEFRA mapped background concentrations for 2022 and 2030 indicate background concentrations are below the NO_2 and PM_{10} AQS objectives and $PM_{2.5}$ AQS objective and targets. The annual mean NO_2 concentrations at the DEFRA PCM links in the study area show that there is no risk of exceeding the air quality limit value.

Receptors

7.5.19. The closest receptors to the Proposed Development are:

- Apartment buildings which are located to the south off Great Ancoats Street, approximately 45 m from the Site boundary
- Apartment buildings along Redhill Street, approximately 20 m to the northwest
- Apartment buildings on Old Mill Street, approximately 170 m to the southeast
- The Co-op Academy New Islington School, approximately 10 m to the north
- Ancoats Primary Care Centre (a health care facility) is approximately 80 m to the east of the Site
- There are also cafes, shops, commercial buildings, footpaths (along the canals) and public amenity areas nearby

7.5.20. Two non-statutory designated sites have been identified within the study area; Rochdale Canal Stott's Lane LWS (immediately adjacent to the north of the Site) and Ashton Canal LWS (approximately 190 m south of the Site at the closest point). These sites are also designated as Sites of Biological Significance. These sites are not considered sensitive to air quality (nitrogen deposition) and are therefore scoped out of the assessment of vehicle emissions, however, have been considered as low sensitivity receptors within the construction dust assessment.

7.5.21. The area surrounding the Site including the LWS and selected sensitive human health receptors are shown in ES (Volume 5) Figure 7.2 and ES (Volume 5) Figure 7.3.

7.6. Potential impacts

Construction phase

7.6.1. During construction there could be increased emissions of dust from dust-raising activities on Site. There is the potential for elevated dust deposition and soiling at nearby receptors (such as residential properties, Co-op Academy New Islington, Ancoats Primary Care Centre), if dust raising activities are not effectively controlled and mitigated. The level and distribution of dust emissions varies according to the duration and location of activity, weather conditions, and the effectiveness of suppression measures.

7.6.2. Air quality could also be affected by changes in traffic flows, as a result of vehicles travelling to and from the Site transporting materials, plant and labour.

7.6.3. It should be noted that any effects during the construction phase would be of a temporary nature only.

Operation phase

7.6.4. Once operational, there is potential for adverse effects on air quality at sensitive human health receptors within the study area due to changes in traffic flows associated with the Proposed Development.

7.7. Assessment of effects

Construction phase

Embedded mitigation

7.7.1. The following section outlines the embedded mitigation measures for the construction phase, which have been factored into the impact assessment. Embedded mitigation measures comprise legal requirements or standard practices that will be implemented as part of the Proposed Development. These are measures that would be implemented regardless of the assessment outcomes, for example, as a result of legislative requirements and/or standard best practice.

7.7.2. The construction works associated with the Proposed Development, which have the potential to generate dust emissions, will be controlled/minimised for the duration of the Proposed Development construction through a Construction Environmental Management Plan (CEMP) which will detail appropriate best practice mitigation measures to be adhered to during all construction works.

7.7.3. Selected mitigation measures given in the IAQM Construction Dust Guidance which are specified as highly recommended measures are listed in Table 7-15 below including a medium risk for demolition, earthworks and trackout, and a high risk for construction activities. This table provides a list of measures that will be included within the CEMP. Selection of the requisite measures to be applied will be determined through consultation the Local Planning Authority (LPA) once the appointed construction contractor has developed the detailed proposals for construction activities.

Table 7-15 – Selected construction dust mitigation measures

IAQM mitigation ID	Mitigation measure
Communications	
1	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
2	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.
3	Display the head or regional office contact information.
4	Develop and implement a CEMP, which may include measures to control other emissions, approved by the Local Authority. The desirable measures will be included as appropriate for the Site. The CEMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.
Site management	
5	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.
6	Make the complaints log available to the local authority when asked.
7	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 logbook.
8	Hold regular liaison meetings with other high risk construction sites within 250 m of the Site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions

IAQM mitigation ID	Mitigation measure
	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	
9	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 windowsills within 100 m of Site boundary, with cleaning to be provided if necessary
10	Carry out regular Site inspections to monitor compliance with the Dust Management Plan (DMP), record inspection results, and make an inspection log available to the local authority when asked.
11	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.
12	Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority where required.
Preparing and maintaining the Site	
13	Plan Site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
14	Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on Site.
15	Fully enclose Site or specific operations where there is a high potential for dust production and the Site is active for an extensive period.
16	Avoid Site runoff of water or mud.
17	Keep Site fencing, barriers and scaffolding clean using wet methods.
18	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.
19	Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery and sustainable travel	
21	Ensure all vehicles switch off engines when stationary - no idling vehicles.
22	Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
23	Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas.
Operations	
26	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.
27	Ensure an adequate water supply on the Site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
28	Use enclosed chutes and conveyors and covered skips.

IAQM mitigation ID	Mitigation measure
29	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
30	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	
31	Avoid bonfires and burning of waste materials.
Demolition	
32	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
33	Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground
34	Avoid explosive blasting, using appropriate manual or mechanical alternatives.
35	Bag and remove any biological debris or damp down such material before demolition.
Construction	
39	Avoid scabbling (roughening of concrete surfaces) if possible.
40	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.
41	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
42	For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	
43	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.
44	Avoid dry sweeping of large areas.
45	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
46	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
47	Record all inspections of haul routes and any subsequent action in a site logbook.
48	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
49	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the Site where reasonably practicable).
50	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.

IAQM mitigation ID	Mitigation measure
51	Access gates to be located at least 10 m from receptors where possible.

7.7.4. In addition to the IAQM Construction Dust Guidance, other embedded mitigation comprises:

- There will be no on-site concrete batching as part of the construction phase of the Proposed Development.

Construction effects - construction dust

7.7.5. In accordance with IAQM Construction Dust Guidance, an initial screening assessment was carried out to determine the location and number of sensitive receptors within relevance distances of the Site. There are human health receptors (high sensitivity) located within 250 m of the boundary of the Proposed Development and ecological sites within 50 m of the boundary or access routes. As such a qualitative dust assessment was conducted. The construction dust risk buffers are presented in ES (Volume 5) Figure 7.1.

Sensitivity of surrounding area

7.7.6. The Co-op Academy New Islington Primary School is located within 20 m and of the Proposed Development Site boundary. The school has 400 pupils (high sensitivity receptors) and therefore the sensitivity of the surrounding area to dust soiling is classed as “high” for demolition, construction, earthworks and construction activities. There are also a number of commercial properties/buildings within 20 m of the trackout route likely to be used by construction traffic up to 250 m from the Proposed Development. Consequently, the sensitivity of the surrounding area to dust soiling is also classed as “high” for trackout.

7.7.7. Although annual mean PM_{10} concentrations are low (below 24 µg/m^3 in the area), given the proximity of the Co-op Academy New Islington Primary School to the Proposed Development, the sensitivity of the surrounding area to human health impacts is classed as “medium”.

7.7.8. There are no statutory ecological designations within 50 m of the Site boundary or trackout route. However, LWS Rochdale Canal Stott's Lane and Rochdale Canal SBI non-statutory site is located within 20 m of the Site boundary. The LWS is considered to have a low sensitivity to dust deposition effects. The sensitivity of the surrounding area to ecological receptor is therefore classed as “low”.

7.7.9. Table 7-16 summarises the sensitivity of the area to human health impacts and dust soiling impacts taking into account the sensitivity of the receptors, distance to source, background PM_{10} concentrations and overall numbers of affected receptors as described above.

Table 7-16 - Sensitivity of surrounding area

Potential Impact	Demolition	Earthworks	Construction	Trackout	Justification
Dust Soiling	High	High	High	High	Primary school with 400 pupils (high sensitivity receptors) located within 20 m and of the Site boundary
Human Health	Medium	Medium	Medium	Medium	Primary school with 400 pupils (high sensitivity receptors) located within 20 m and of the Site boundary however annual

					mean PM_{10} concentrations are low (below 24 µg/m^3)
Ecological	Low	Low	Low	Low	Non-statutory site is located within 20 m of the Site boundary

Dust emission magnitude

7.7.10. Table 7-17 shows the assumed dust emission magnitude for each construction activity. Due to a lack of definitive design information at this stage, a conservative approach and assumptions have been adopted.

Table 7-17 - Dust emission magnitude

Activity	Dust Emission Magnitude	Justification
Demolition	Large	Based on concrete hardstanding removal consisting of a potentially dusty construction material and on-site crushing and screening, and a small building to be demolished with estimated total building volume of < 12,000m^3
Earthworks	Medium	Based on the assumption that the soil on Site is moderately dusty and the total Site area is between 18,000 – 110,000 m^2
Construction	Large	Based on a total volume of construction greater than 75,000 m^3 (two 6/7 floors buildings to be constructed).
Trackout	Medium	Based on a peak of < 50 HDV movements per day with unpaved road on site < 100 m in length

Dust risk

7.7.11. The potential risk from dust soiling and human health impacts, given the dust emission magnitudes and sensitivities described above, are summarised in Table 7-18 demonstrating the overall dust risk for the Proposed Development is “medium” for earthworks and trackout and “high” for demolition and construction activities without embedded mitigation being in place. With the embedded mitigation measures in place, any adverse effects resulting from the construction works should be minimised further such that there is no significant residual effect on nearby receptors.

Table 7-18 - Summary of dust risk

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

Construction effects - construction vehicle emissions

7.7.12. Summary data of expected construction traffic during the different phases of the construction works is presented in ES (Volume 4) Appendix 7.1 Table 1.14. In any given phase of construction works, the total number of daily HDV movements is expected to be limited to a maximum of 35 daily trips (which occurs during phase 3 – construction of the superstructure) and a maximum as an annual average in any individual construction year of 29 daily trips (when considering the adjacent phased works). Although this meets the IAQM Planning Guidance traffic screening criteria requiring an assessment (25 AADT HDV) any associated impacts will be short-term with the peak period of individual construction elements

lasting a maximum of 9 months and when averaged over the four-year construction period, there is expected to be an average of 11 daily HDV movements, which is less than half the relevant IAQM Planning Guidance traffic screening criteria. Where traffic changes fall below the criterion, the impact on air quality can be considered to be negligible.

7.7.13. In any given phase of construction works, the total number of daily LDV movements is expected to be up to a maximum of 235 daily trips (again during phase 3 – construction of the superstructure) and a maximum as an annual average in any individual construction year of 227 daily trips (when considering the adjacent phased works). When averaged over the four-year construction period, there is expected to be an average of 135 daily LDV movements. Although this meets the IAQM Planning Guidance traffic screening criteria requiring an assessment (100 AADT LDV), LDV, unlike HDV traffic, are not expected to access the Site from only the A665. As with the operational phase traffic, site operatives and visitors travelling by car (which make up the majority of LDV flows) would be expected to use a range of local car parking options. The change in LDV flows on any one given road is therefore not expected to meet the IAQM Planning Guidance traffic screening criteria. Consequently, no further quantitative assessment was therefore considered to be required.

7.7.14. It is also noted that the expected increase in LDV on the local road network during the construction of the Proposed Development is lower than that during the operational phase. Any impact on air quality would therefore be expected to be lower than that presented within the operational phase assessment. The impact on air quality from construction traffic can therefore be considered to be negligible. Any effect on air quality from construction traffic will also be temporary and is not considered to be significant.

Operation phase

Embedded mitigation

7.7.15. There is no project specific embedded mitigation in regard to operational vehicle emissions.

Operation effects

7.7.16. The findings from the local air quality assessment for the operation of the Proposed Development are provided in this section. Modelled concentrations at all existing receptors in the operational year (2030), both with and without the Proposed Development, have been combined with background concentrations and compared with relevant AQS objectives and targets. In addition, the magnitudes of change in concentration at specific receptors have been described and the significance of these changes has been interpreted in line with the IAQM Planning Guidance.

Nitrogen dioxide (NO_2)

7.7.17. Total annual mean NO_2 concentrations and changes in concentrations for the selected human health receptors are presented in Table 7-19 for the Proposed Development opening year of 2030.

7.7.18. The annual mean concentrations at all receptors are estimated to be well below the annual mean AQS objective for NO_2 of 40 µg/m^3 in 2030, both without and with the Proposed Development. The highest annual mean NO_2 concentration is found at R17 (a residential building on Great Ancoats Street), which has a modelled concentration of 20.5 µg/m^3 both with and without the Proposed Development. The maximum modelled increase in annual mean NO_2 is 0.1 µg/m^3 at multiple receptors, including locations along A665 to south of Laystall Street, on Addington Street, Corporation Street and Cheetham Hill Road. The impacts on annual mean NO_2 concentrations as a result of the additional traffic generated by the Proposed Development are defined as negligible at all locations in line with IAQM Planning Guidance.

7.7.19. Since only annual mean NO_2 concentrations have been generated using the air dispersion model, commentary on potential exceedances of the hourly mean NO_2 standard have been made through reference to DEFRA's LAQM.TG(22) guidance which suggests that if annual mean concentrations of NO_2 do not exceed 60 µg/m³ then it is unlikely that hourly mean concentrations would exceed the relevant objective, which allows for 18 exceedances of the hourly standard in a calendar year.

7.7.20. As the total annual mean concentrations are below 60 µg/m³ at all receptors it is therefore highly unlikely that hourly mean concentrations would exceed the 1-hour mean AQS objective.

7.7.21. It should be noted that the Co-op Academy New Islington School has not been included as a discrete human health receptor within the air dispersion model. Model receptors were selected based on their proximity to the ARN. Given, the school is located approximately 135m from the closet ARN link (A665 Great Ancoats Street), it does not represent a 'worse case' location. R13 (representative of the Proposed Development Site) is located within 10m of the same section of the A665 Great Ancoats Street. The modelled annual mean NO_2 concentration at R13 is 15.1 µg/m³ both with and without the Proposed Development. The increase in annual mean NO_2 is therefore less than 0.1 µg/m³ with the impact at this location is defined as negligible. Any impact on annual mean concentrations at the Co-op Academy New Islington School, located over 100m further from the A665 Great Ancoats Street would therefore be smaller still.

Table 7-19 - Annual mean NO_2 concentrations (µg/m³)

Receptor ID	Location	2030 without	2030 with	Change	Impact Descriptor
R1	Great Ancoats Street	20.1	20.2	0.1	Negligible
R2	Great Ancoats Street	19.2	19.3	0.1	Negligible
R3	Old Mill Street	20.0	20.1	0.1	Negligible
R4	Great Ancoats Street	12.2	12.2	<0.1	Negligible
R5	Oxid House, Newton Street	13.6	13.6	<0.1	Negligible
R6	Great Ancoats Street	13.9	13.9	<0.1	Negligible
R7	Cheetham Hill Road	18.7	18.8	0.1	Negligible
R8	Rochdale Road	12.8	12.8	<0.1	Negligible
R9	Blossom Street	12.4	12.4	<0.1	Negligible
R10	Old Mill Street	18.9	18.9	<0.1	Negligible
R11	Pollard Street	18.7	18.7	<0.1	Negligible
R12	Addington Street	14.4	14.5	0.1	Negligible
R13	New Receptor at the Proposed Site	15.1	15.1	<0.1	Negligible
R14	Store Street (New Development 126608_FO_2020)	18.9	18.9	<0.1	Negligible
R15	Great Ancoats Street (132489_FO_2021)	13.5	13.5	<0.1	Negligible
R16	Residence Inn, Great Ancoats Street (future hotel new development135662/FO/2022)	20.0	20.1	0.1	Negligible
R17	Great Ancoats Street	20.5	20.5	<0.1	Negligible
R18	Corporation Street	19.5	19.5	<0.1	Negligible

Receptor ID	Location	2030 without	2030 with	Change	Impact Descriptor
R19	Future Receptor CDN/24/0834, Adair Street	17.7	17.8	0.1	Negligible
R20	Angel Street	13.0	13.0	<0.1	Negligible
R21	Great Ancoats Street	19.4	19.5	0.1	Negligible
R22	Cheetham Hill Road	18.0	18.0	<0.1	Negligible
R23	Laystall Street (future new residential development 128911/FO/2020)	18.7	18.7	<0.1	Negligible
R24	Pollard Street (Ibis hotel)	14.3	14.4	0.1	Negligible

Particulate matter (PM_{10})

7.7.22. Total annual mean PM_{10} concentrations and changes in concentrations of PM_{10} at the modelled human health receptors are presented Table 7-20.

7.7.23. Annual mean concentrations of PM_{10} are expected to be well below the annual mean AQS objective of 40 µg/m^3 at all modelled receptors in 2030 both without and with the Proposed Development. Furthermore, the Proposed Development is expected to result in negligible changes in concentrations at all receptor locations.

7.7.24. There are no estimated exceedances of the PM_{10} 24-hour mean AQS objective at the modelled receptors, either without or with the Proposed Development.

Table 7-20 –Annual mean PM_{10} concentrations (µg/m^3)

Receptor ID	Location	2030 without	2030 with	Change	Impact Descriptor
R1	Great Ancoats Street	16.2 (0)	16.3 (0)	0.1	Negligible
R2	Great Ancoats Street	14.6 (0)	14.7 (0)	0.1	Negligible
R3	Old Mill Street	15.9 (0)	16.0 (0)	0.1	Negligible
R4	Great Ancoats Street	13.1 (0)	13.1 (0)	<0.1	Negligible
R5	Oxid House, Newton Street	15.5 (0)	15.5 (0)	<0.1	Negligible
R6	Great Ancoats Street	16.0 (0)	16.1 (0)	0.1	Negligible
R7	Cheetham Hill Road	16.0 (0)	16.1 (0)	0.1	Negligible
R8	Rochdale Road	14.1 (0)	14.1 (0)	<0.1	Negligible
R9	Blossom Street	13.4 (0)	13.4 (0)	<0.1	Negligible
R10	Old Mill Street	13.9 (0)	14.0 (0)	0.1	Negligible
R11	Pollard Street	13.6 (0)	13.6 (0)	<0.1	Negligible
R12	Addington Street	16.8 (1)	16.9 (1)	0.1	Negligible
R13	New Receptor at the Proposed Site	18.1 (1)	18.2 (2)	0.1	Negligible
R14	Store Street (New Development 126608_FO_2020)	13.8 (0)	13.9 (0)	0.1	Negligible

Receptor ID	Location	2030 without	2030 with	Change	Impact Descriptor
R15	Great Ancoats Street (132489_FO_2021)	15.3 (0)	15.4 (0)	0.1	Negligible
R16	Residence Inn, Great Ancoats Street (future hotel new development135662/FO/2022)	16.0 (0)	16.0 (0)	<0.1	Negligible
R17	Great Ancoats Street	16.8 (1)	16.9 (1)	0.1	Negligible
R18	Corporation Street	17.3 (1)	17.4 (1)	0.1	Negligible
R19	Future Receptor CDN/24/0834, Adair Street	14.2 (0)	14.3 (0)	0.1	Negligible
R20	Angel Street	14.5 (0)	14.5 (0)	<0.1	Negligible
R21	Great Ancoats Street	17.2 (1)	17.4 (1)	0.2	Negligible
R22	Cheetham Hill Road	14.6 (0)	14.6 (0)	<0.1	Negligible
R23	Laystall Street (future new residential development 128911/FO/2020)	13.5 (0)	13.5 (0)	<0.1	Negligible
R24	Pollard Street (Ibis hotel)	16.7 (1)	16.8 (1)	0.1	Negligible

Particulate matter ($PM_{2.5}$)

7.7.25. Total annual mean $PM_{2.5}$ concentrations and changes in concentrations of $PM_{2.5}$ for the modelled human health receptors are presented in Table 7-21.

7.7.26. Annual mean concentrations of $PM_{2.5}$ are expected well below the AQS objective of 20 µg/m^3 at all modelled receptors without and with the Proposed Development and also below the interim $PM_{2.5}$ annual mean target of 12 µg/m^3 to be achieved by 2028. However, annual mean concentrations of $PM_{2.5}$ are expected to be above the target of 10 µg/m^3 to be met by 2040 with and without the Proposed Development at receptors R1, R13, R17, R21 and R24, located on A665 Great Ancoats Street and R12 on Addington Street and R18 Corporation Street (values provided in **bold** in Table 7-21 below). Concentrations are predicted to equal the 10 µg/m^3 target with and without the Proposed Development at R3, Old Mill Street and, R6 and R16, Great Ancoats Street. The Proposed Development is expected to result in negligible changes in annual mean $PM_{2.5}$ concentrations at all receptor locations relative to the AQS objective.

7.7.27. Given that the Proposed Development is expected to have a negligible impact on annual mean $PM_{2.5}$ concentrations, the Proposed Development is not considered to impact the ability to meet the $PM_{2.5}$ annual mean target in future years.

Table 7-21 - Annual mean $PM_{2.5}$ concentrations (µg/m^3)

Receptor ID	Location	2030 without	2030 with	Change	Impact Descriptor
R1	Great Ancoats Street	**10.1**	**10.1**	<0.1	Negligible
R2	Great Ancoats Street	9.2	9.2	<0.1	Negligible
R3	Old Mill Street	9.9	10.0	0.1	Negligible
R4	Great Ancoats Street	8.4	8.4	<0.1	Negligible

Receptor ID	Location	2030 without	2030 with	Change	Impact Descriptor
R5	Oxid House, Newton Street	9.6	9.7	0.1	Negligible
R6	Great Ancoats Street	9.9	10.0	0.1	Negligible
R7	Cheetham Hill Road	9.9	9.9	<0.1	Negligible
R8	Rochdale Road	8.9	8.9	<0.1	Negligible
R9	Blossom Street	8.5	8.6	0.1	Negligible
R10	Old Mill Street	8.9	8.9	<0.1	Negligible
R11	Pollard Street	8.7	8.7	<0.1	Negligible
R12	Addington Street	**10.3**	**10.4**	0.1	Negligible
R13	New Receptor at the Proposed Site	**11.0**	**11.1**	0.1	Negligible
R14	Store Street (New Development 126608_FO_2020)	8.8	8.8	<0.1	Negligible
R15	Great Ancoats Street (132489_FO_2021)	9.6	9.6	<0.1	Negligible
R16	Residence Inn, Great Ancoats Street (future hotel new development135662/FO/2022)	9.9	10.0	0.1	Negligible
R17	Great Ancoats Street	**10.4**	**10.4**	<0.1	Negligible
R18	Corporation Street	**10.5**	**10.6**	0.1	Negligible
R19	Future Receptor CDN/24/0834, Adair Street	8.9	9.0	0.1	Negligible
R20	Angel Street	9.1	9.1	<0.1	Negligible
R21	Great Ancoats Street	**10.5**	**10.6**	0.1	Negligible
R22	Cheetham Hill Road	9.1	9.1	<0.1	Negligible
R23	Laystall Street (future new residential development 128911/FO/2020)	8.6	8.6	<0.1	Negligible
R24	Pollard Street (Ibis hotel)	**10.3**	**10.3**	<0.1	Negligible

Assessment of significance

7.7.28. The results of the local air quality assessment indicate that concentrations of NO_2, PM_{10} and $PM_{2.5}$ are unlikely to exceed AQS objectives or the $PM_{2.5}$ 2028 interim target at any modelled receptor, either without or with the Proposed Development, in the full opening year 2030. The impact of the Proposed Development on annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations relative to the relevant AQS objective at all modelled receptors is negligible. No exceedances of the hourly mean NO_2 standard or the daily mean PM_{10} standard are expected to occur with or without the Proposed Development.

7.7.29. Although the $PM_{2.5}$ annual mean target of 10 µg/m^3 to be achieved by 2040 is exceeded at six receptor locations (as indicated in Table 7-21), the impact of the Proposed Development on annual mean $PM_{2.5}$

concentrations at all modelled receptors is negligible. Therefore, the Proposed Development is not considered to impact the ability to meet the $PM_{2.5}$ annual mean target in future years.

7.7.30. Given the impact of changes in road traffic emissions on local air quality as a result of the operation of the Proposed Development is negligible at all receptors. the effect is therefore considered not significant.

Comparison to WHO guidelines

7.7.31. GMCA has a commitment to meeting 2005 WHO guidelines on air quality by 2030. Therefore, the operational phase assessment results have also been compared to the WHO 2005 guidelines.

7.7.32. The AQS annual mean and hourly mean objectives for NO_2 are the same as the 2005 WHO guidelines and as such the comparison to the WHO guidelines are as presented in Table 7-4. For PM_{10} annual mean concentrations are below the 2005 WHO guideline of 20 µg/m^3 at all modelled receptors, for both the 2030 without and with Proposed Development. The estimated number of exceedances of the daily mean standard is also expected to be below the 2005 WHO guideline. For $PM_{2.5}$, annual mean concentrations are above the 2005 WHO guideline of 10 µg/m^3, which is equal to the new $PM_{2.5}$ target to be met by 2040, at six receptor locations.

Damage cost calculations

7.7.33. Pollution emission cost calculations “damage costs” have been produced in line with Manchester City Council’s (MCC) “Air Quality & Planning Guidance” to provide a basis for estimating a financial commitment to offset increased emissions. The calculations are presented in Table 7-22 and Table 7-23 below. The conclusions of the pollution emission cost calculations indicate that the Proposed Development fully operational in the 2030 opening year, would result in a cost associated with transportation emissions of £62,564 over five years.

Table 7-22 – Emission factor toolkit emission calculations for 5 years

Year	Car	HDV	LDV	Trip Length (km)	Annual NOx Emissions (kg)	Annual $PM_{2.5}$ Emissions (kg)
2030	1296	12	383	10	497.1	104.2
2031	1296	12	383	10	421.7	103.6
2032	1296	12	383	10	359.6	103.0
2033	1296	12	383	10	310.2	102.5
2034	1296	12	383	10	272.7	102.0

Table 7-23 – Calculation of pollution emission cost for 5 Years

Year	Discounted Central Damage Cost Per Tonne NOx	Discounted Central Damage Cost Per Tonne $PM_{2.5}$	NOx Cost (Discounted Central)	$PM_{2.5}$ Cost (Discounted Central)	Total Cost (Discounted Central)
2030	£11,590	£82,970	£5,761	£8,650	£14,411

Year	Discounted Central Damage Cost Per Tonne NOx	Discounted Central Damage Cost Per Tonne $PM_{2.5}$	NOx Cost (Discounted Central)	$PM_{2.5}$ Cost (Discounted Central)	Total Cost (Discounted Central)
2031	£11,590	£82,970	£4,816	£8,467	£13,283
2032	£11,590	£82,970	£4,045	£8,298	£12,343
2033	£11,590	£82,970	£3,438	£8,134	£11,572
2034	£11,590	£82,970	£2,978	£7,977	£10,955
TOTAL (Central Present Value)					**£62,564**

7.8. Additional mitigation and enhancement measures

7.8.1. Embedded mitigation measures, which have been accounted for as part of the impact assessment, are summarised in the sections above. The impact assessment concludes that no potential significant effects remain, therefore no additional mitigation measures are required.

7.9. Residual effects

Construction phase

7.9.1. Appropriate site-specific embedded mitigation would be implemented during the construction phase of the Proposed Development which would ensure the residual dust impact on human and ecological receptors would be minimised such that they are negligible, and the effect therefore is 'Not Significant'.

Operation phase

7.9.2. Air quality impacts from vehicle emissions are expected to be negligible at all human health receptors during operation, the effect therefore is 'Not Significant'.

7.10. Cumulative effects

7.10.1. This section considers the cumulative effects of the Proposed Development (intra-project cumulative effects) and the Proposed Development interacting with other RFFPs (inter-project cumulative effects) from the perspective of impacts within the scope of the Air Quality topic.

Cumulative effects assessment

7.10.2. The further consideration of cross-topic intra-project and inter-project cumulative effects is reported in ES (Volume 2) Chapter 22: Cumulative Effects.

Intra-project in-combination cumulative effects assessment (single project impacts) within topic

7.10.3. The focus of intra-project cumulative effects assessment (CEA) is understanding how receptors may experience a number of different types of impacts from the Proposed Development at the same time.

Within the topic assessments, the Air Quality assessment methodology focuses on single impact types within the main assessment. As such, the assessment is not inherently cumulative.

7.10.4. However, it is not expected that any post-mitigation residual effects on human and ecological receptors will occur during either construction or operation. Therefore, there are no intra-project cumulative effects within the air quality topic.

Inter-project cumulative effects assessment (different project impacts) within topic

7.10.5. The inter-project cumulative effects assessment 'within topic' element for the air quality assessment has been completed with reference to the shortlist list of RFFPs that has been developed for the Proposed Development. The list is based on a review of all developments known to the planning system using the methodology described in ES (Volume 2) Chapter 22: Cumulative Effects.

7.10.6. The RFFP short list (ES (Volume 4) Appendix 22.1) has been screened to identify projects that are considered to have a realistic prospect of interacting with the Proposed Development from the perspective of air quality. The sift from the short-list to identify RFFPs that should be scoped into the inter-project CEA for air quality took into consideration;

- The scale of the other Proposed Development – all RFFP considered.
- Proximity to the Proposed Development – RFFP within 500m considered
- The likelihood of concurrent construction activities – RFFP likely to be constructed in the same timeframe as the Proposed Development considered

7.10.7. This process identified potential for inter-project impacts as a result of the Proposed Development in combination with seven RFFPs due to the scale of the Proposed Developments, their proximity to the Proposed Development Site and the potential for concurrent construction activities. These RFFPs are;

- 128191/FO/2020 - Development comprising of five office buildings with flexible ground floor use at land between Ashton Canal and Pollard Street.
- 132574/FO/2021– Development comprising 4 townhouses at Paradise Wharf.
- 126608/FO/2020 - Development of 66 residential units between Store Street and Ashton Canal.
- 135662/FO/2022 - Development of 154 Bedroom Hotel with ancillary café / bar / restaurant and gym adjacent to Great Ancoats Street and south of Laystall Street.
- 135675/FO/2022 - Development of two apartment buildings comprising 267 dwellings at Tariff Street.
- 137346/FO/2023 - Mixed use development comprising commercial floorspace and 256 residential units adjacent to Poland Street and between Naval Street and Jersey Street.
- 128911/FO/2020 - Mixed use development consisting of office space and 89 residential units at Laystall Street.

Potential inter-project impacts

Construction

7.10.8. Cumulative inter-project impacts on air quality could occur in conjunction with the RFFPs identified as relevant to the Proposed Development. The following inter-project cumulative effects with the RFFPs may arise during construction of the Proposed Development:

Dust

7.10.9. Cumulative effects during the construction phase may occur where dust generating activities from separate projects are in proximity and are likely to occur at the same time, resulting in additive dust generating effects that may be experienced by nearby receptors. IAQM Dust Guidance advises cumulative impacts may occur where multiple construction sites contribute to the risk of trackout on the same section of public highway or where receptors are located within 250 m of multiple development sites. Hence a zone of influence of 500 m has been adopted to identify the potential for inter-project construction dust effects related to the construction phase.

7.10.10. It is anticipated that the developers of the RFFPs will adopt comparable mitigation measures to the Proposed Development in order to adhere to relevant legislation and operate in accordance with best practice. On this basis it is not considered that there would be a likely significant cumulative effect from additive construction dust impacts.

7.10.11. Appropriate site-specific embedded mitigation would be implemented during the construction phase of the Proposed Development which would ensure the dust impact on human and ecological receptors would be minimised such that they are negligible, and the effect therefore is 'Not Significant'.

Construction vehicle emissions

7.10.12. Cumulative effects on air quality could also occur where changes in traffic flows during construction from separate projects occur at the same time. This could be as a result of temporary traffic management measures that change the location and frequency of queuing vehicles and/or additional vehicles travelling to and from the construction Site transporting materials, plant and labour.

7.10.13. The air quality assessment for the Proposed Development concludes that the relevant criteria within IAQM Planning Guidance, triggering an assessment, would not be exceeded for the Proposed Development when considering the construction period in full and the likely distribution of LDV traffic on the network. The RFFPs will however collectively contribute to construction traffic within the study area and there is potential for significant additive cumulative effects to arise due to increased traffic emissions.

7.10.14. The potential for cumulative effect from construction vehicle emissions for the duration of the construction project should be considered further within the Construction Environmental Management Plan (CEMP) when more detailed information on vehicle movements are available from both the Proposed Development contractor and RFFPs with overlapping construction periods. Any cumulative effect on air quality from construction traffic will however be temporary and is considered unlikely to be significant given current baseline concentrations at relevant receptors.

7.10.15. As such, cumulative air quality impacts from vehicle emissions are expected to be negligible at human health receptors during construction The impact on air quality from construction traffic can therefore be considered to be negligible and the effect therefore is 'Not Significant'

Operation

7.10.16. Cumulative inter-project impacts on air quality occur in conjunction with the RFFPs identified as relevant to the Proposed Development. The following inter-project cumulative effects with the RFFPs may arise during operation of the Proposed Development:

Operational vehicle emissions

7.10.17. The traffic modelling for the operational phase used to assess the air quality effects due to operation of the Proposed Development incorporates flows from committed developments. The potential for cumulative effects to arise on air quality from traffic emissions has therefore been considered within the

Proposed Development scenario of the operational air quality assessment. Although the cumulative change in traffic may lead to an increase in vehicle emissions and pollutant concentrations, given that pollutant concentrations are expected to be well below relevant AQS objectives in the Proposed Development opening year, the additive effect on air quality from additional traffic from the RFFPs is unlikely to result in a significant effect on air quality.

7.10.18. Cumulative air quality impacts from vehicle emissions are expected to be negligible at human health receptors during operation, and 'Not Significant'.

Mitigation measures

7.10.19. To ensure that no significant construction inter-project effects occur, cumulative effects from construction vehicle emissions for the duration of the construction project should be considered further within the CEMP.

7.11. Summary and conclusions

7.11.1. The Proposed Development is located within Greater Manchester AQMA. Monitoring data has shown annual mean NO_2 AQS objectives have been exceeded at several roadside locations in the study area, however these sites are not considered to be representative of relevant exposure. DEFRA mapped background concentrations for 2022 and 2030 indicate background concentrations are below the NO_2 and PM_{10} AQS objectives and $PM_{2.5}$ AQS objective and targets. The annual mean NO_2 concentrations at the DEFRA PCM links in the study area, show that there is no risk of exceeding the air quality limit value.

7.11.2. The air quality assessment for the Proposed Development has been undertaken in line with relevant industry best practice guidance. MCC were consulted through pre-application and provided advice in response to the Scoping Report which has informed the approach to the assessment reported in this ES. No issues were raised by MCC.

7.11.3. The assessment of dust emissions during construction of the Proposed Development has been considered in the context of the overall scale and nature of the proposals under consideration and the potential sensitivity of neighbouring land uses and follows the methodology within the IAQM Construction Dust Guidance.

7.11.4. The assessment of the likely changes in air pollutant concentrations because of traffic changes during operation of the Proposed Development followed the ‘detailed’ assessment methodology outlined in IAQM Planning Guidance. A dispersion model has been used to estimate NO_2 and particulate matter concentrations at selected receptors for an opening year (2030) with and without the Proposed Development. Assessment of significance of the air quality effects with the Proposed Development in the opening year of 2030 has been undertaken, considering the change in concentrations and total concentrations at receptors in line with IAQM Planning Guidance.

7.11.5. An assessment of potential dust and air quality effects associated with the construction of the Proposed Development has been undertaken, including cumulatively with other projects (inter-project effects). Appropriate site-specific embedded mitigation would be implemented during the construction phase of the Proposed Development which would ensure dust effects on human and ecological receptors are 'Not Significant'.

7.11.6. Air quality impacts from construction vehicle emissions have been assessed qualitatively and are expected to be negligible at human health receptors and 'Not Significant'. Air quality impacts from operational vehicle emissions have been assessed quantitatively and are expected to be negligible at

human health receptors and 'Not Significant'. Inter-project cumulative effects on human receptors during construction or operation are considered to be 'Not Significant'.

7.12. No significant effects for air quality are expected therefore additional mitigation measures are not required for either the construction or operation phase. The residual effects assessment findings are therefore unchanged from the main assessment, with no significant adverse effects predicted for air quality during either the construction or operation phases.

Table 7-24 – Summary of effects

Resource / Receptor / affected group	Sensitivity of receptor	Activity or impact	Embedded design mitigation	Effect Magnitude Type Spatial extent Duration Likelihood	Significance of effect	Additional mitigation	Residual effect
Construction							
Human (dust soiling effects)	High	Demolition works	IAQM general measures 1-31 and specific demolition measures 32-35.	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	Not Significant
		Earthworks	IAQM general measures 1-31	Effect: Adverse Magnitude Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	
		Construction works	IAQM general measures 1-31 and specific construction measures 39-42	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	
	High	Trackout	IAQM general measures 1-31 and	Effect: Adverse Magnitude: Negligible Type: Direct	Not significant	No	

Resource / Receptor / affected group	Sensitivity of receptor	Activity or impact	Embedded design mitigation	Effect Magnitude Type Spatial extent Duration Likelihood	Significance of effect	Additional mitigation	Residual effect
			specific trackout measures 43-51	Spatial extent: Local Duration: Temporary Likelihood: Likely			
Human (human health effects)	Medium	Demolition works	IAQM general measures 1-31 and specific demolition measures 32-35.	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	Not Significant
		Earthworks	IAQM general measures 1-31	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	
		Construction works	IAQM general measures 1-31 and specific construction measures 39-42	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	
		Trackout	IAQM general measures 1-31 and	Effect: Adverse Magnitude: Negligible	Not significant	No	

Resource / Receptor / affected group	Sensitivity of receptor	Activity or impact	Embedded design mitigation	Effect Magnitude Type Spatial extent Duration Likelihood	Significance of effect	Additional mitigation	Residual effect
			specific trackout measures 43-51	Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely			
Ecological	Low	Demolition works	IAQM general measures 1-31 and specific demolition measures 32-35.	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	Not Significant
		Earthworks	IAQM general measures 1-31	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	
		Construction works	IAQM general measures 1-31 and specific construction measures 39-42	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	

Resource / Receptor / affected group	Sensitivity of receptor	Activity or impact	Embedded design mitigation	Effect Magnitude Type Spatial extent Duration Likelihood	Significance of effect	Additional mitigation	Residual effect
		Trackout	IAQM general measures 1-31 and specific trackout measures 43-51	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	
Human health receptors	High[46]	Vehicle emissions	N/A	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Temporary Likelihood: Likely	Not significant	No	Not significant
Operation							
Human health receptors	High[46]	Vehicle emissions	N/A	Effect: Adverse Magnitude: Negligible Type: Direct Spatial extent: Local Duration: Permanent Likelihood: Likely	Not significant	No	Not significant

[46] A level of sensitivity based on criteria and/or thresholds is not used within assessment guidance for determining the potential impact of vehicle emissions on air quality and receptors are considered to have equal sensitivity. For the purposes of this summary table the highest level of sensitivity has been assumed.

7.13. Glossary and Acronyms

Table 7-25 – Glossary and acronyms

Term	Definition
AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ASR	Annual Status Report
AW	Ancient Woodland
CAP	Clean Air Plan (GM CAP)
CEMP	Construction Environmental Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
DT	Diffusion tube
EIA	Environmental Impact Assessment
EPUK	Environmental Protection UK
EU	European Union
GM	Greater Manchester
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
IES	Institution of Environmental Sciences
LAQM.TG	Local Air Quality Management Technical Guidance
LDV	Light Duty Vehicle
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi–Agency Geographic Information for the Countryside
MCC	Manchester City Council
NNR	National Nature Reserve
NO	Nitric Oxide
NOx	Oxides of nitrogen
NO_2	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
O_3	Ozone
PCM	Pollution Climate Mapping
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter 2.5

PM_{10}	Particulate Matter 10
PPG	Planning Practice Guidance
RFFP	Reasonably Foreseeable Future Projects
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest

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