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Land bound by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester

Air Quality Assessment

Island Site (General Partner) Limited

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Executive Summary

Cundall has been commissioned to prepare an Air Quality Assessment Report for the redevelopment of the land bound by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester. Proposals are for demolition of existing buildings and the erection of a 10-storey plus basement office building (Use Class E9g), with flexible ground floor and basement use (Use Class E) and a rooftop garden. The proposed redevelopment lies within Greater Manchester's Air Quality Management Area (AQMA), which was declared due to exceedances of the annual mean nitrogen dioxide (NO_2) objective.

Existing conditions within the study area indicate that there is potential for nitrogen dioxide (NO_2) concentrations in the wider area to exceed the European Limit Value and National Air Quality Objective threshold levels.

The methodology for the assessment has been agreed with the Environmental Health team at Manchester City Council. In setting the scope of assessment, consideration has been made of the potential for impacts to occur during both the construction and operation phases of the development, and the exposure of future occupants of the site to air pollution.

A construction dust impact assessment was undertaken in accordance with Institute of Air Quality Management (IAQM) guidance. It was concluded that without appropriate mitigation measures, Medium risks were posed by demolition, earthworks, construction and trackout activities. Trackout risk assessment is based on the assumption that daily HGVs travelling to the site during the constitution period will not exceed 50. Should there be greater than 50 daily HGVs during construction, high risk mitigation measures would be required for trackout. In comparison with medium risk measures, dust suppressants would be required at locations where a large volume of vehicles enter and exit the construction site. With appropriate mitigation measures implemented for all dust generating activities, it is anticipated that the dust generation and harmful emissions from construction site activities will not be significant.

No car parking is proposed as part of the development. As the actual development traffic flows are therefore likely to fall below the IAQM threshold of 100 Annual Average Daily Traffic (AADT) recommended for developments within AQMAs, an increase in operational traffic is not anticipated to present a significant impact. Therefore, an assessment of traffic-related impacts was scoped out of the operation phase assessment. This was agreed with Manchester City Council.

Energy provision for the building is to be sourced from electricity and will include a mechanical heat recovery system. There will be an emergency backup diesel generator for the office floors, to be located at roof level (36m) as space has been allocated for a similar sized tenant standby generator at ground floor level, with flue at high level ground floor on the centre of the eastern façade. Anticipated use is expected to be 26 hours a year per unit, associated with 30-minute weekly testing. Based on the anticipated usage, the process contribution from the generators is predicted to be well below the criteria for requiring assessment. The NOx emissions are unlikely to give rise to significant impacts. Dispersion modelling has therefore not been carried out.

The Client will commit to the implementation of the best practice mitigation measures identified in this report during the construction phase of the development. It is anticipated that the generation of dust and harmful pollutants emissions from construction site activities will be reduced with the correct implementation of these measures. It is anticipated that a Construction Management Plan will be required as part of a planning permission condition. This would need to conform to Manchester City Council's planning requirements and be agreed with the Local Planning Authority prior to commencement of works.

It is anticipated that the impact of the operation phase on future office users is likely to be negligible, and therefore no mitigation measures are required. Opening louvers are to be provided to all floors to allow natural ventilation to the office space. Indoor air quality testing is likely to be carried out as part of BREEAM accreditation and can provide operational data on indoor air quality to inform the acceptability of the ventilation strategy for the office floors.

There is potential for slight exceedances of annual mean NO_2 concentrations at building facades at ground floor level, and in particular on the southern façade, John Dalton Street, A34. The detailed ventilation strategy for the

flexible ground floor and basement commercial space would need to be agreed by the tenant. A planning condition could be agreed with Manchester City Council relating to the detailed specification of the ventilation strategy. It is likely to comprise mechanical ventilation with heat recovery (MVHR) and should consider the provision of the provision of $PM_{10/2.5}$ filtration as best practice.

Overall, it was concluded that with the provision of appropriate mitigation measures, construction activities and operation impacts will have no significant effects on local air quality. The proposals are therefore compliant with the requirements of the National Planning Policy Framework and Manchester City and Greater Manchester's planning policy.

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1.0 Introduction

1.0 Introduction

Cundall has been commissioned by Island Site (General Partner) Limited to prepare an Air Quality Assessment Report to support a planning application for the redevelopment of the land bound by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester into a 10-storey plus basement office building. The site is located within the Greater Manchester Air Quality Management Area (AQMA).

1.1 Study Area

The Proposed Development area extends to approximately 0.13 hectares (1,300m^2) and is located in the heart of Manchester City Centre. The site comprises a rectangular block of buildings, bound by John Dalton Street to the south, South King Street to the north, Bow Street to the east and Ridgefield to the west.

Three existing buildings are located within the site boundary, comprising:

- Old Colony House (25,968 sq ft), a vacant 7-storey building comprising office accommodation with a vacant former restaurant at ground floor level. The building fronts onto South King Street;
- 5 Ridgefield (11,748 sq ft), a 3-storey building comprising a former restaurant use at basement and ground floor level and vacant offices at first and second floors. The site fronts onto Ridgefield and Bow Street; and
- Grange House (17,309 sq ft), a 6-storey building comprising ground floor retail/restaurant/office use with vacant upper floors formerly in office use. The building fronts onto John Dalton Street

The buildings vary in age and character and are no longer fit for purpose as office accommodation. Demolition of these buildings is required to enable redevelopment.

The location of the development site is illustrated in Figure 1. Additional context is provided by the aerial image (Figure 2).

Figure 1 Location of the Proposed Development (Courtesy of Google Maps)

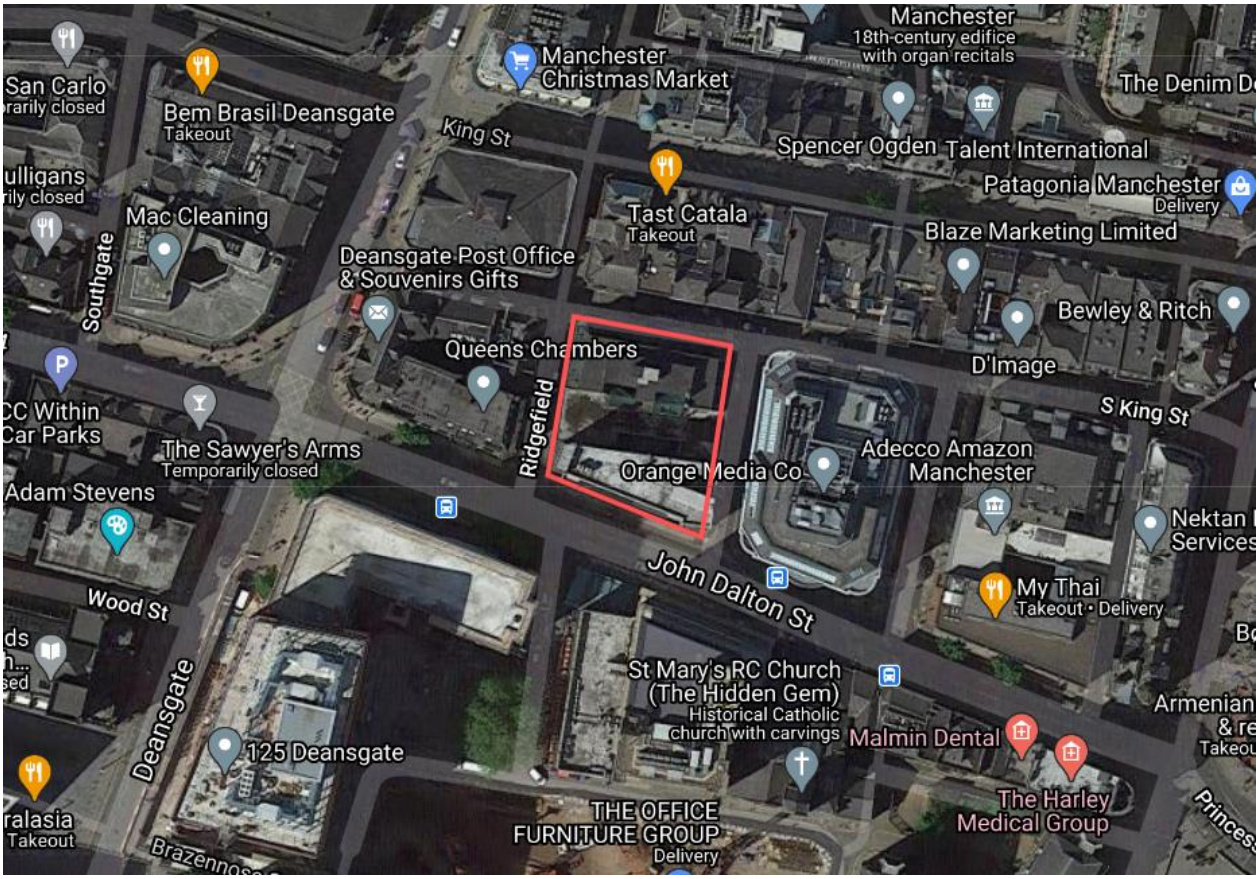


Figure 2 Aerial Image (Courtesy of Google Maps)

1.2 Proposed Development

Proposals are for the demolition of three existing buildings -5 Ridgefield, Old Colony House and Grange House Old - to enable development of a 10-storey plus basement office building (Use Class E (g)), with flexible ground floor and basement uses (Use Class E) and a rooftop terrace. There will also be works to facilitate the pedestrianisation of the southern part of Ridgefield and other associated works.

The proposed land use allocation for the development is summarised in Table 1 and is based on the accommodation schedule provided by Cartwright Pickard in their Design and Access Statement[1]. Floors 1 to 9 are to be office space. The basement and ground floor are to be rented out to a tenant for flexible commercial space. The basement will include cycle parking and welfare facilities.

A proposed elevation plan is reproduced in Figure 3, courtesy of Cartwright Pickard.

Table 1 Proposed Area Schedule

Floor	Proposed Use	Flexible Units		Office Area	
		Unit A (m^2)	Unit B (m^2)	Building Common Area Gross Internal Area (GIA) (m^2)	Office Area Gross Internal Area (NIA) (m^2)
B	Flexible units (Class E)	194	n/a	1,092	n/a
GF	Flexible units (Class E)	470	252	1,200	n/a
01	Office space (class E(g))			1,200	963
02	Office space (class E(g))			1,210	978
03	Office space (class E(g))			1,210	978
04	Office space (class E(g))			1,210	978
05	Office space (class E(g))			1,210	978
06	Office space (class E(g))			1,210	978
07	Office space (class E(g))			1,210	978
08	Office space (class E(g))			1,210	978
09	Office space (class E(g))			659	449
10	External roof terrace			19	n/a
Total		**670**	**252**	**12,640**	**8,258**

[1] Cartwright Pickard (2021) Land bound by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester, Design and Access Statement, May 2021, Ref: 834-CPA-XX-XX-RP-A-9002 rev E

Figure 3 Proposed Elevations (Courtesy of Cartwright Pickard)

1.3 Scope of Assessment

This assessment has been prepared in support of the planning application and considers the potential for effects to occur during both the construction and operation phases of the development.

This air quality assessment outlines the relevant air quality legislation and policy guidance and presents the assessment methodology. The main pollutants of concern for this assessment are oxides of nitrogen (NO_x), including nitrogen dioxide (NO_2), fine and very fine particulate matter (PM_{10} and $PM_{2.5}$). The existing air quality conditions are presented and the likely air quality impacts from construction and operation of the Proposed Development are considered. The effects are assessed in the context of relevant national, regional and local air quality legislation, polices and guidance. Mitigation measures are proposed, as required, to reduce the effect of the Proposed Development to negligible, as far as reasonably practicable.

The scope of the assessment is detailed further in section 3.

This assessment has been undertaken by Cundall's Air Quality Team, who are professionally chartered and are Members of the Institute of Air Quality Management (MIAQM). Full details are provided in Appendix A.

1.4 Consultation with Manchester City Council (MCC)

Following the execution of an initial screening and scoping exercise, consultation with Manchester City Council's Air Quality Team was undertaken in March 2021 to discuss and agree the scope of the assessment. Further details are provided in Appendix B.

2.0

Legislation, Policy and Guidance

2.0 Legislation, Policy and Guidance

2.1 Key Legislation and Policy

This assessment considers key air quality legislation, which is summarised in Table 2.

Table 2 Key Legislation

Legislation	Description
EU Ambient Air Quality Directive 2008/50/EC[4]	Establishes the requirements of Member States in terms of improvements required to air quality. Sets standards for a variety of pollutants for human-health and the environment.
The Air Quality Standards Regulations 2010[5]	Transposes formalised EU Limit Values set out in directive 2008/50/EC to UK law.
The Clean Air Quality Strategy 2019[6]	The Clean Air Strategy sets out the case for action and demonstrates the government's determination to improve air quality. In some cases, the goals are even more ambitious than EU requirements to reduce people's exposure to toxic pollutants like nitrogen oxides, ammonia, particulate matter, non-methane volatile organic compounds and sulphur dioxide.
Environment Act 1995, Part IV[7]	Defines the requirements for Local Air Quality Management (LAQM).
Environment Protection Act 1990, Amended by the Pollution Prevention and Control Act 1999[8]	Part III provides statutory nuisance provisions for nuisance dust. Nuisance complaints about dust would need to be investigated by the Local Authority. In practice, dust deposition is generally managed appropriately by suitable on-site practices and mitigation, avoiding the determination of statutory nuisance and/or prosecution or enforcement notices.
The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018[9]	Developers and contractors are required to meet compliance with the emission standards for Non-Road Mobile Machinery (NRMM). The Regulations exercise of the powers conferred by section 2(2) of, and paragraph 1A of Schedule 2 to, the European Communities Act 1972 in relation to the type, description, construction or equipment of vehicles.

The air quality EU limit values and UK Air Quality Objectives (AQOs) which apply to this assessment are shown in Table 3[10]. Some pollutants have long-term (annual mean) objectives due to the chronic way they affect human health or the natural environment and others have short-term (1-hour, 24-hour mean) objectives due to the acute way they affect human health and the natural environment.

[4] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
[5] HMSO (2010). Statutory Instrument 2010 No. 1001, The Air Quality Standards Regulations 2010, London: HMSO
[6] Department for Environment Food and Rural Affairs (Defra) (2019) Clean Air Strategy 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf
[7] Environment Act 1995, Chapter 25, Part IV Air Quality
[8] Environmental Protection Act 1990, Chapter 43, Part III Statutory Nuisances and Clean Air https://www.legislation.gov.uk/ukpga/1990/43/part/III
[9] HMSO (2018) The Non-Road Mobile Machinery Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018, UK Statutory Instruments, 2018 No. 764, https://www.legislation.gov.uk/uksi/2018/764/made
[10] Other pollutants have been screened out of this assessment as exceedance of their respective objectives is not anticipated to be associated with the pollutant sources of relevance to this assessment.

Table 3 AQO and EU Limit Values

Pollutant	Averaging Period	Objective Threshold / EU Limit Value (µg/m^3)
Nitrogen Dioxide (NO_2)	Annual mean	40
	1-hour mean	200 Not to be exceeded more than 18 times per year (equivalent to the 99.79th percentile of 1-hour mean values)
Particulate Matter (PM_{10})	Annual mean	40
	24-hour mean	50 Not to be exceeded more than 35 times per year (equivalent to the 90.4th percentile of 24-hour mean values)
Particulate Matter ($PM_{2.5}$)	Annual mean	25

Previous research carried out on behalf of Defra identified that exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m^3. This assumption is still considered valid; therefore, Defra's Technical Guidance document, LAQM.TG (16) confirms that this figure can be referenced where 1-hour mean monitoring data are not available (typically if monitoring NO_2 using passive diffusion tubes).

Greater Manchester have signed up to achieve World Health Organisation (WHO) BreatheLife[11] City status by 2030, which means achieving WHO targets by this date, including 20µg/m^3 annual mean PM_{10} and 10µg/m^3 annual mean $PM_{2.5}$. It should be noted that there is no clear evidence of a safe exposure level for the air quality pollutants relative to this assessment, listed in Table 3. Reducing concentrations are far as feasibly possible if therefore likely to bring additional health benefits.

[11] BreatheLife, A global campaign for clean air, https://breathelife2030.org/

2.2 Planning Policy and Guidance

Consideration of the strategic location and design of new developments is of key important in the land-use planning process and can provide a means of improving air quality. Air quality considerations as part of development applications may become material in determining planning applications. Relevant planning policy and guidance at the National, Regional, and Local levels as summarised in Table 4.

Table 4 Key Policy and Guidance

Policy / Guidance	Description
National Policy and Guidance	
Ministry of Housing, Communities & Local Government - National Planning Policy Framework (NPPF) (2019)[12]	The National Planning Policy (NPPF) published March 2012 and last updated in June 2019 with the purpose of planning achieving sustainable development. Paragraph 181 of the NPPF states that: "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or National objectives for pollutants, taking into account the presence of AQMAs and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making Stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in AQMAs and Clean Air Zones is consistent with the local air quality action plan". In addition, paragraph 103 states that: *"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."* Paragraph 170 discusses how planning policies and decisions should contribute to and enhance the natural and local environment. Of relevance to air quality, NPPF notes that this can be achieved by: *"e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans"*
Planning Policy Guidance (updated 2019)[13]	Planning Practice Guidance (PPG) documents have been published as part of the NPPF. PPG relating to air quality was last updated in November 2019. It provides guidance on the significance of air quality in determining the local impact of proposed developments and highlights the importance of local and neighbourhood plans with regard to air quality. A flowchart is provided to assist local authorities in determining how air quality considerations might fit into development management processes.
Clean Air Strategy (2019)[14]	Defra published a Clean Air Strategy in January 2019, setting out a wide range of actions for UK Government to reduce pollutant emissions and improve air quality. The actions are grouped into four main emission sources: Transport, Domestic, Farming and Industry

[12] Ministry of Housing, Communities & Local Government, National Planning Policy Framework, June 2019 https://www.gov.uk/government/publications/national-planning-policy-framework--2

[13] Ministry of Housing, Communities and Local Government (2019) Planning Practice Guidance: Air Quality, updated 1 November 2019 https://www.gov.uk/guidance/air-quality--3

[14] Department for Environment, Food and Rural Affairs (2019) Clean Air Strategy 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

Policy / Guidance	Description
UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations. Detailed Plan. Defra / Department of Transport (DfT) (2017)[15]	This plan was produced in response to a UK Supreme Court Ruling and sets out how the UK will achieve compliance with EU Limit Values for nitrogen dioxide (NO_2) in the shortest possible time. The plan outlined infrastructure initiatives and grants and the requirements for Local Authorities to produce local action plans, with the aim of reducing NO_2 concentrations below the objective as soon as practically possible.
Regional Planning Policies	
Greater Manchester's Clean Air Plan[16]	Eight Greater Manchester authorities were identified by the Government as having roads which are expected to continue to exceed the maximum legal limits of NO_2 in 2021. They were directed by Government to undertake feasibility studies to identify measures for reducing NO_2 concentrations to compliant levels in the 'shortest possible time'. These studies must produce a series of business cases for assessing and implementing the relevant measures to address the problem. The 10 Greater Manchester local authorities, Greater Manchester Combined Authority (GMCA) and Transport for Greater Manchester (TfGM) have worked together to develop a Clean Air Plan to tackle nitrogen dioxide (NO_2) exceedances at the roadside, known as GM CAP. The latest GMCA report from 29th January 2021 outlines the progress and next steps for the development of the GM CAP. The key developments can be summarised as follows: ▪ Government ministers have agreed to consider extending Greater Manchester's Clean Air Zone (CAZ) charges to the sections of the A628/A57 in Tameside. This will be subject to full assessment of the potential impacts, to be led by Highways England. ▪ GM was awarded £14.7m of funding for retrofitting of buses ▪ No confirmation or offer of government funding has been received regarding taxi and private hire electric charge points. ▪ Due to the dynamic context of COVID-19 and national and regional/local lockdowns, progress on the development of the final plan will be provided by the Green City Region Lead, as required at GMCA meetings
Greater Manchester Air Quality Action Plan 2016-2021 (AQAP)[17]	The AQAP identifies a range of actions to reduce emissions and mitigate the impacts on air quality. Some Key actions regards development and transportation are: ▪ Actions for managing new development: ▪ Construction Management Guidance – where a key priority area is affected by a proposed scheme, a high level of mitigation control will be requested. ▪ Development Planning Guidance - to ensure that potential local air quality effects are not overlooked and is not intended to introduce a burden on developers or local authorities to undertake unnecessary work. ▪ Cumulative Development Database - A centralised database of significant planning applications and air quality assessments will be managed by Transport for Greater Manchester (TfGM), as a record of the cumulative effects of multiple developments and thereby facilitate combined approaches to minimising emissions. ▪ Clean Air Zone – TfGM will undertake an appraisal of the effects of charging Clean Air Zones (CAZ) ▪ 20mph Zones - The implementation of 20mph zones in urban areas has been cited as having the potential to benefit local air quality through smoother vehicle flow through junctions and reduced acceleration and braking, as well as having potential for additional benefits from encouraging modal shift from driving to walking or cycling

[15] Department for Environment, Food and Rural Affairs / Department for Transport (2017) UK plan for tackling roadside nitrogen dioxide concentrations, July 2017 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633269/air-quality-plan-overview.pdf
[16] Clean Air Greater Manchester, Greater Manchester Combined Authority (GMCA) reports, https://cleanairgm.com/gmca-reports/
[17] Greater Manchester Combined Authority/ Transport for Greater Manchester, Greater Manchester Air Quality Action Plan 2016-2021, https://www.manchester.gov.uk/downloads/download/4166/air_quality_reports

Policy / Guidance	Description
	▪ Encouraging Travel Planning - Individuals and companies are encouraged to look at travel planning measures, and to investigate the potential of additional demand management measures to effect a significant mode shift and to stimulate the uptake of low-emission vehicles ▪ Taxi and Private Hire Quality Controls to Priorities Low-Emission Vehicles ▪ Green Infrastructure - The provision of green infrastructure in and around urban areas is now widely recognised as contributing towards creating places where people want to live and work.
Greater Manchester Low-Emission Strategy (2016)[18]	The Low-Emission Strategy sets out a framework for policies and measures to: ▪ Reduce air pollution as a contributor to ill-health in Greater Manchester ▪ Support the UK government in meeting EU air quality thresholds Contribute to a reduction in Greater Manchester's carbon footprint; and encourage low-emission behaviours in the culture and lifestyles of the city region.
Greater Manchester Planning Guidance on Air Quality[19]	Greater Manchester Combined Authority (GMCA) have adopted the most recent IAQM guidance on the assessment and control of dust from demolition and construction sites, and also for air quality considerations in land-use planning and development control. Applicants, developers and consultants are advised to read the IAQM guidance prior to submitting a planning application.
Greater Manchester's Plan for Homes, Jobs and the Environment, - Draft for Approval (2020)[20]	The plan was prepared on behalf of the 10 Greater Manchester local authorities and looks ahead to the period 2020 to 2037. The plan • sets out how Greater Manchester should develop up until 2037 • identifies the amount of new development that will come forward across the 10 districts, in terms of housing, offices, and industry and warehousing, and the main areas in which this will be focused; • supports the delivery of key infrastructure, such as transport and utilities; • protects the important environmental assets across the city region; • allocates sites for employment and housing outside of the existing urban area; and • defines a new green belt boundary for Greater Manchester
Greater Manchester Places for Everyone Joint Plan[21]	Following an announcement in December 2020, nine Greater Manchester councils (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan) will discuss proposals to work together on a joint development plan. The Places for Everyone would underpin Grater Manchester's ambitious plans for sustainable and inclusive growth, building on evidence already collected. The nine councils will continue to work closely with Stockport Council, who decided in 2020 to withdraw from the Greater Manchester Spatial Framework.
Local Planning Policies	
The Manchester Core Strategy 2012-2027[22]	The strategy aims to improve air quality and detailed in Policy EN 16: "*The Council will seek to improve the air quality within Manchester, and particularly within AQMAs, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of*

[18] Greater Manchester Combined Authority/ Transport for Greater Manchester, (2016) Greater Manchester Low-Emission Strategy, December 2016 https://www.greatermanchester-ca.gov.uk/media/1276/low-emission-strategy-dec-2016.pdf
[19] Manchester City Council, Additional Planning Guidance, Environmental information for developers, https://www.manchester.gov.uk/info/500207/planning_and_regeneration/1962/additional_planning_guidance/3
[20] Greater Manchester Combined Authority, (2020) Greater Manchester's Plan for Homes, Jobs and the Environment: Greater Manchester Spatial Framework Publication Plan 2020, Draft for Approval October 2020, https://www.greatermanchester-ca.gov.uk/media/3663/221020-agma-issue-opt.pdf
[21] Greater Manchester Combined Authority,(2021) Greater Manchester councils to set out next steps with Places for Everyone joint plan, 05/02/2021, https://www.greatermanchester-ca.gov.uk/news/greater-manchester-councils-to-set-out-next-steps-with-places-for-everyone-joint-plan/
[22] Manchester City Council (2012), Manchester's Local Development Framework, Core Strategy Development Plan Document, Adopted 11th July 2012 https://www.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027

Policy / Guidance	Description
	emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from CHP, and biomass plant. *When assessing the appropriateness of locations for new development the Council will consider the impacts on air quality, alongside other plan objectives. These includes cumulative impacts, particularly in AQMAs.*"
Other Relevant Policy and Guidance	
Defra Local Air Quality Management (LAQM) Policy Guidance (2016)[23] and Technical Guidance (2021)[24]	The guidance issued under Part IV of the Environment Act 1995 is designed to help local authorities with their LAQM duties. The guidance sets out the general approach to use and detailed technical guidance to guide local authorities through the Review and Assessment process.
EPUK/IAQM Land Use Planning & Development Control (2017)[25]	This guidance has been produced to ensure that air quality is adequately considered in the land use planning and development control processes by relevant officers within local authorities, developers, and consultants involved in the preparation of development proposals and planning applications. This document is best practice guidance and has no formal or legal status.
Environmental Protection UK (EPUK) / IAQM Assessment of Dust from Demolition and Construction (2016)[26]	The document provides guidance for developers, their consultants and environmental health practitioners on how to undertake a construction impact assessment (including demolition and earthworks). The guidance provides a method for assigning a magnitude of risk (high, medium or low) and identifies appropriate mitigation measures.
Covid-19: Supplementary Guidance, Local Air Quality Management Reporting in 2021[27]	The guidance had been informed by responses from an impact survey received following the release of the interim statement on Covid-19 impacts to the LAQM regime. The guidance is to be read in conjunction with LAQM.TG16.

[23] Defra (2016) Local Air Quality Management Policy Guidance (PG16) https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf
[24] Defra (2021) Local Air Quality Management Technical Guidance TG(16) April 2021 https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf
[25] EPUK/IAQM, (2017) Land-Use Planning & Development Control: Planning for Air Quality https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf
[26] IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf
[27] Department for Environment, Food and Rural Affairs (Defra) / Greater London Authority (2021). Covid-19: Supplementary Guidance, Local Air Quality Management Reporting in 2021, April 2021, Version 1.0, https://laqm.defra.gov.uk/supporting-guidance.html

3.0

Approach and Methodology

3.0 Approach and Methodology

3.1 Overall Approach

The overall approach of this air quality assessment comprises the following:

- A review of existing conditions within the study area, defined as 2km from the boundary of the Proposed Development
- An assessment of the potential to change in air quality conditions as a result of the construction and operation of the Proposed Development; and
- The formulation of appropriate mitigation measures, where required, to mitigate any adverse impacts on air quality as a result of the construction and/or operation of the Proposed Development and/or to protect the health of future residents of the Proposed Development.

The environmental health officer at Manchester City Council has been contacted to agree the scope and methodology of this assessment. The email correspondence is included as Appendix B.

3.2 Existing Conditions

Existing ambient air quality conditions relates to relevant pollution that is already present in the environment from various sources such as industrial processes, commercial and domestic activities, road traffic emissions and natural resources.

Existing sources of emissions within the study area (2km) have been defined using several approaches, as follows:

- Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register[28] and the Environment Agency's Pollution Inventory Data[29].
- Local sources have also been reviewed through examination of the latest Annual Status Report (ASR) for Greater Manchester Combined Authority[30]
- Background concentrations have been defined using the national pollution maps published by Defra[31]. These cover the whole country on a 1x1 km grid.

3.3 Construction Phase

The development proposals comprise the following activities:

- Demolition of existing buildings - 5 Ridgefield, Old Colony House and Grange House
- Construction of new 10-storey plus basement

At this stage it is anticipated that construction will commence in late 2022 at the earliest. This will include demolition, construction, earthworks and trackout activities. The potential for air quality effects during the construction phase has been assessed, and the extent of mitigation required for dust/ Particulate Matter (PM_{10}) generated by construction activities has been considered.

Machinery used during construction can generate new sources of emissions, as well as traffic movements to/from the site and the works themselves. When assessing the effect of dust emissions generated during construction works, receptors include those nearest to the construction boundary of the site in each direction. These receptors have the potential to experience effects of greater magnitude due to emissions of dust generated by the works, when compared with more distant receptors.

[28] Defra (2012) UK Pollutant Release and Transfer Register (PRTR) data sets https://www.gov.uk/guidance/uk-pollutant-release-and-transfer-register-prtr-data-sets
[29] Environment Agency, Pollution Inventory https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory
[30] Greater Manchester Combined Authority (2019) Greater Manchester Combined Authority 2019 Air Quality Annual Status Report (ASR), June 2020, https://www.manchester.gov.uk/downloads/download/4166/air_quality_reports
[31] Department for Environment, Food and Rural Affairs (Defra) (2019). Background Mapping data for local authorities, http://uk-air.defra.gov.uk/data/laqm-background-home

Without appropriate mitigation controls in place, there is the potential for adverse effects to occur during to the construction of the Proposed Development. The implementation of best practice mitigation controls can ensure any potential adverse effects would be not significant.

The impact of anticipated construction activities has been assessed in accordance with IAQM guidance, Guidance on the Assessment of Dust from Demolition and Construction v1.1 (2016)[32].

The construction phase assessment considers the anticipated physical activities occurring on-site that are likely to result in the generation of dust which gives rise to impacts on dust soiling and human health, especially through the generation of PM_{10} and $PM_{2.5}$.

The assessment involves the identification of whether each phase of on-site activity (demolition, earthworks, construction, and trackout) represents a low, medium, or high risk of causing a significant effect and then identifies suitable mitigation measures for the relevant level of risk assigned. Details of the IAQM construction impact assessment procedure are presented in Appendix C.

3.4 Operation Phase

IAQM's guidance note 'Land-Use Planning & Development Control: Planning for Air Quality' (updated in January 2017) was issued to ensure that air quality is adequately considered in the land-use planning and developmental control process. Full details are provided in Appendix D. To determine the need for operational assessment, a screening assessment has been undertaken using the criteria outlined in the IAQM guidance note (Appendix G).

3.4.1 Combustion Plant Impact

Any on-site combustion plant such as boilers and combined heat and power (CHP) has the potential to impact air quality receptors both on and off-site. Emissions from combustion plant would include NO_2 and possibly also PM_{10} and $PM_{2.5}$ if diesel is used as a source.

Energy for the building is to be sourced from electricity and will include mechanical heat recovery. A new substation will be included within the building. There will be an emergency backup diesel generator for the office floors, to be located at roof level (36m). As space has been allocated for a similar sized tenant standby generator of similar at ground floor level, with flue at high level ground floor on the centre of the eastern façade. Anticipated use is expected to be 26 hours a year per unit, associated with 30-minute weekly testing. An initial calculation based on Environment Agency (EA)'s spreadsheets has been carried to predict process contributions (PC) (Appendix F). The results show that the maximum PC for NO_2 is likely to well below the long-term and short-term criteria at both 0m and 30m flue heights. Based on the anticipated use, the NOx emissions are unlikely to give rise to significant impacts. Dispersion modelling has therefore not been carried out.

3.4.2 Road Traffic Impacts

The Proposed Development has the potential impact existing air quality as a result of pollutants from road traffic exhaust emissions, such as NO_2, PM_{10} and $PM_{2.5}$, associated with traffic travelling to and from the development during the operational phrase.

The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant. Interpretation of this guidance was used to develop a methodology for the assessment of road impact emissions. As the site is located within an AQMA, the EPUK/IAQM guidance states the following criteria to establish where an air quality assessment is likely to be considered necessary:

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) movements; and
- A change of Heavy-Duty Vehicle (HDV) flows of more than 25 AADT movements.

[32] IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

No car parking is proposed as part of the development. The actual change in LDV flows associated with the Proposed Development is therefore anticipated to be below 100. In addition, the site is within the area of the proposed Clean Air Zone (CAZ). Further reductions in traffic volumes are therefore expected in the area. As a result, detailed assessment for operational traffic has been scoped out.

3.4.3 Human Exposure

An air quality assessment of new exposure of the Proposed Development itself was undertaken in accordance with IAQM guidance This assessment evaluated the exposure that future site users might experience associated with existing baseline conditions, considering the following:

- The background and future baseline air quality, and whether this will be likely to approach, or exceed, the threshold values set by the air quality objectives
- The presence and location of air quality focus areas as an indicator of local hotspots where the air quality objective thresholds may be exceeded
- The presence of any heavily trafficked roads, with emissions that could give rise to significantly higher concentrations of pollutants (e.g. NO_2), that would cause unacceptably high exposure for users of the new development
- The presence of non-road transport sources that may be significant, such as nearby airports, railway lines with high traffic usage of diesel locomotives[33] or coal-fired steam locomotive railway lines.

The current/baseline conditions were established qualitatively by reviewing relevant air quality information that is readily available from the Local Authority, including Review and Assessment Reports and historic monitoring data. These data were used to understand current/baseline pollutant concentrations at receptors within the study area, and the risk that any changes in air quality may cause exceedance of AQOs at these locations.

[33] Defra (2009), Local Air Quality Management Technical Guidance (TG09) - which lists rail lines with a heavy traffic of diesel passenger trains

4.0

Site Description and Baseline Conditions

4.0 Site Description and Baseline Conditions

To assess the significance of any new development proposal (in terms of air quality), it is necessary to identify and understand the baseline air quality conditions in and around the study area. This provides a reference against which any potential changes in air quality can be assessed. Since air quality is predicted to change in the future (mainly because of changes to vehicle emissions), the baseline situation is extrapolated forward to the opening year. The future baseline scenario is the predicted baseline for the opening year.

To identify the existing air quality conditions, a review of publicly available information has been undertaken, including the latest local authority air quality reports, monitoring data, and background concentration maps. This section presents the results of the review.

4.1 Local Sources of Pollution

Industrial air pollution sources are regulated through operating permits or authorisations, which list stringent emission requirements. Regulated industrial process are classified as either Part A or Part B processes and are regulated through the Pollution Prevention and Control (PPC) system[34] which has been transposed into National legislation[35]. The larger, more polluting, Part A processes are regulated by the Environment Agency for emissions to air, water and land. The smaller, less polluting processes are regulated by the local authority for emission to air.

The Environment Agency Pollutant Inventory for 2018 [36] indicated that no Part A permit sites are located within 2km of the Proposed Development.

A review of environmental permit data held by Manchester Council [37] was carried out. There are Part B processes within 2km of the Proposed Development. These relate to 3 dry cleaners within 1km, Presbar Diecastings Ltd, Redbank Service Station and Packaging Products (Coatings) Ltd within 2km.

The most recent ASR (2020) did not list any no new industrial sources.

The emissions from any industrial installations are assumed to be represented in the background concentrations listed in section 4.3.

4.2 Local Air Quality Management

The Environment Act 1995 requires local authorities to review and assess air quality with respect to the objectives for seven pollutants specified in the National Air Quality Strategy. Local authorities are required to carry out an assessment and provide an Annual Status Report (ASR) of their area every year. If the ASR identifies any potential hotspot areas likely to exceed air quality objectives, a detailed assessment of those areas is required. If objectives are not predicted to be met, the local authority must declare the area as an AQMA. If an AQMA has been declared, the Local Authority will also need to produce an Air Quality Action Plan (AQAP), to includes measures to improve air quality in the AQMA.

The Proposed Development is located in Manchester city centre. The baseline assessment includes a brief review and summary of the Greater Manchester Combined Authority's latest available Annual Status Report for 2019 (ASR) and the data available from Clean Air Greater Manchester[38].

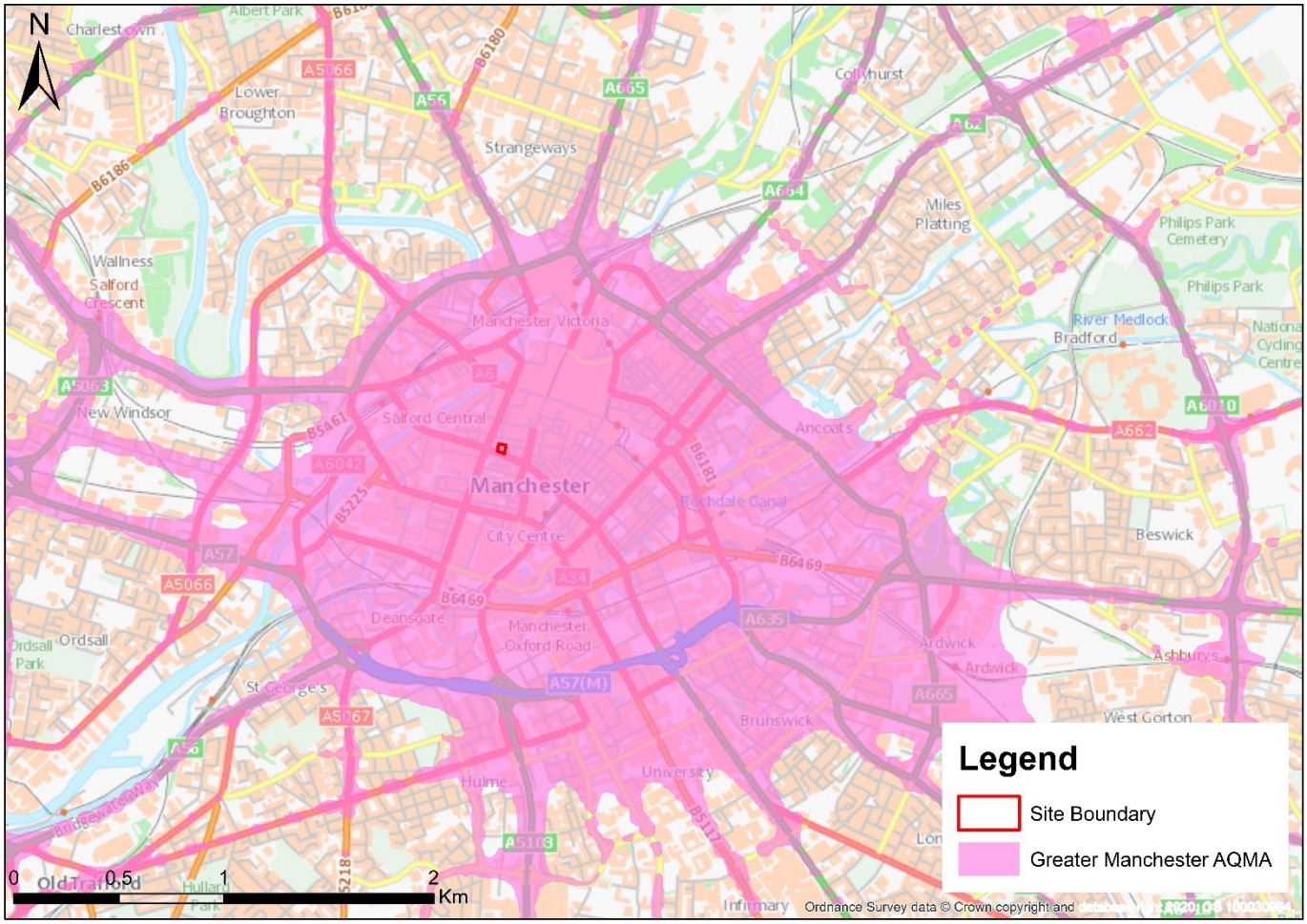
A single AQMA was designated on the 1st May 2016 for the whole of Greater Manchester and reflects the location of the motorways, major roads and urban areas, for exceedances of the annual mean NO_2 objective threshold. The extent of the AQMA in relation to the Proposed Development is shown in Figure 4. The AQAP was published in 2016[39] and sets

[34] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
[35] The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390
[36] https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory.
[37] Manchester City Council, Environmental Permits Part B, https://www.manchester.gov.uk/directory/68/environmental_permits_part_b
[38] Clean Air Greater Manchester, https://cleanairgm.com/
[39] Greater Manchester Combined Authority / Transport for Greater Manchester (2016) Greater Manchester Air Quality Action Plan 2016-2021, https://www.manchester.gov.uk/downloads/download/4166/air_quality_reports

out measures to improve air quality in the AQMA. The latest ASR reports that Defra have responded positively to Greater Manchester's suggestion that update of the AQAP should be postponed until the impact of the proposed Greater Manchester wide Clean Air Zone (CAZ) is fully evaluated and understood.

There is currently no AQMA declared for PM_{10} exceedances in Manchester.

Figure 4 Greater Manchester Air Quality Management Area (AQMA)



4.2.1 Local Air Quality Monitoring

A review of existing local air quality conditions in the vicinity of the Proposed Development has been undertaken. Automatic and diffusion tube monitors within 2km of the Proposed Development have been evaluated as part of this assessment.

4.2.1.1 Automatic Monitoring

Automatic or continuous monitoring involves drawing air through an analyser continuously to obtain near real-time pollutant concentration data. A review of the most recent ASR from Greater Manchester Combined Authority showed that MCC operates two automatic monitoring stations with 2km of the Proposed Development. The location of the automatic monitors is shown in Figure 5 and details about the automatic monitoring sites is provided in Table 5.

Figure 5: Local Automatic Monitoring Sites

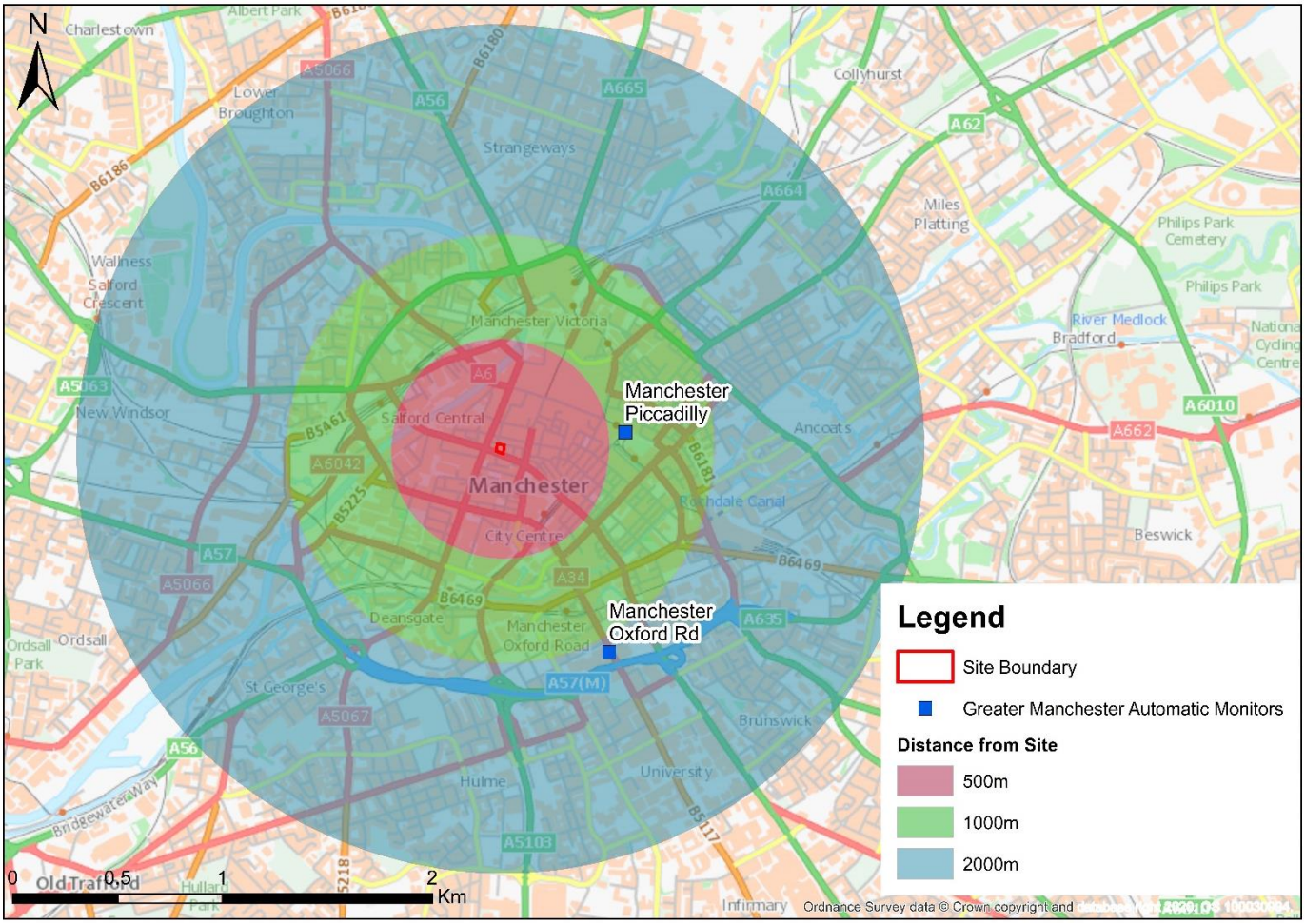


Table 5 Details of Automatic Monitoring Sites within 2km

Site ID	Site Location	OS Grid Reference		Site Type	Pollutants Monitored	Distance to kerb of nearest road (m)
		x	y			
MAN1	Manchester Oxford Road	384233	397287	Urban Traffic	NO_2, PM_{10}	1
MAN3	Manchester Piccadilly	384310	398337	Urban Centre	NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2	30

Recent NO_2 monitoring results from 2015 to 2019 are shown in Table 6, with numbers of hourly exceedances of 200µg/m^3 indicated in brackets. An exceedance is defined as an annual mean greater than 40µg/m^3 for NO_2, or when the hourly average value exceeds 200µg/m^3 more than 18 days within a calendar year. All exceedances of the objective thresholds are indicated in bold.

These results show that the NO_2 annual mean air quality objective was exceeded all years in the period 2015 to 2016 at the urban traffic site (MAN1) and recorded at the objective at the urban centre site (MAN3) in 2016. The number of hourly exceedance of 200µg/m^3 have been well below the permissible 18 days at both sites since 2017.

Table 6: Results of Local Air Quality Monitoring at Automatic Sites – Nitrogen Dioxide

Site ID	Site Type	Distance from Site	Annual Mean NO_2 Concentration (µg/m³)				
			2015	2016	2017	2018	2019
MAN1	Urban Traffic	900m south	**66 (60)**	**66 (90)**	**65** (6)	**62** (2)	**59** (1)
MAN3	Urban Centre	245m north-east	39 (1)	40 (0)	36 (1)	35 (0)	36 (0)

Exceedances of the annual mean air quality objective are indicated in **bold.** **Underlined** values exceed 60 µg/m³, the value at which exceedances of the short-term objective are likely to occur.

Annual mean concentrations of PM_{10} recorded at the monitoring sites within 2km are shown in Table 7, with number of days exceedance shown in brackets. An exceedance is defined as an annual mean greater than 40µg/m³ for PM_{10}, or when the daily value exceeds 50µg/m³ more than 35 days within a calendar year.

Table 7 Results of Local Air Quality Monitoring at Automatic Sites- PM_{10}

Site ID	Site Type	Distance from Site	Annual Mean PM_{10} Concentration (µg/m³)				
			2015	2016	2017	2018	2019
MAN1	Urban Traffic	900m S	28 (25)	27 (16)	27 (15)	30 (15)	26 (18)
MAN3	Urban Centre	240m NE	20 (3)	20 (3)	20 (3)	21 (2)	20 (7)

Annual mean concentrations of PM_{10} have met the air quality objective at sites in all years. Excluding a marginal exceedance in 2018, the concentrations at the urban centre site have not exceeded the WHO target of 20µg/m³, which Greater Manchester is aiming to achieve by 2030 (see section 2.1). Concentrations at the urban traffic site on Oxford Road have been above the WHO target in recent years, with a maximum of 30µg/m³ recorded in 2018. The number of times daily averages have been recorded above 50µg/m³ have been below the permissible 35 days at all sites since 2017. Trends have remained broadly static at all sites since 2015.

Annual mean concentrations of $PM_{2.5}$ for the monitoring sites are shown in Table 8. An exceedance is defined as an annual mean greater than 25µg/m³ for $PM_{2.5}$. Annual mean concentrations of $PM_{2.5}$ have been below the air quality objective at the site between 2015 and 2019. Concentrations have also been close to or only marginally above the WHO target of 10µg/m³, which Greater Manchester is aiming to achieve by 2030 (see section 2.1).

Table 8 Local Background Air Quality Monitoring

Site ID	Site Type	Distance from Site	Annual Mean $PM_{2.5}$ Concentration (µg/m³)				
			2015	2016	2017	2018	2019
MAN3	Urban Centre	240m NE	10	10	8	11	12

4.2.1.2 Non-Automatic Monitoring

The Clean Air Greater Manchester Website[40] shows that GMCA has over 400 NO_2 diffusion tubes monitoring sites in Greater Manchester, 14 of which are within 2km of the Proposed Development. Of the locations in the vicinity of the Proposed Development, nine of these are "Urban traffic" sites, two are "Kerbside" and the remainder three being "Urban background". The locations of the sites of interest for this assessment are shown in Figure 7. Details of the diffusion tubes are given in Table 9.

It should be noted that the site type stated as "Urban traffic" would be considered as either a "Roadside" or "Kerbside" site following LAQM.TG (16)[24]. All of the urban traffic sites within 2km are within one to fifteen metres of the kerb of a busy road and as stated in LAQM.TG16[24] they would therefore be considered as Roadside locations.

Table 9 Details of Diffusion Tube Monitoring Sites within 2km

Site ID	Site Location	OS Grid Reference		Site type	Distance to kerb of nearest road (m)
		x	y		
MAN09AB	Newton Street	384601	398303	Kerbside	0.5
MAN24	Princess Street /Cooper Street	383954	398060	Kerbside	0.5
MAN26AB	Long Millgate	383971	398876	Urban background	59
MAN29A	Oxford Street	384117	397505	Urban traffic	2.0
MAN59/ 59B/ 59C	Piccadilly Gardens	384310	398337	Urban background	56
MAN71	Great Ancoats Street	385161	398290	Urban traffic	2.0
MAN72	Lockton Close	384761	397384	Urban background	46
MAN77	Hewitt Street	383602	397488	Urban traffic	2.0
MAN82/ 83/ 84	Oxford Road	384233	397287	Urban traffic	4.0**
MAN88	Angel Street	384469	398981	Urban traffic	2.0
SA27	Frederick Street	383076	398738	Urban traffic	1.5
SA39	Trinity Way	383040	398563	Urban traffic	8.0
SA59	West Crown Avenue	381822	397895	Urban traffic	14
SA60	Regent Road	382445	397724	Urban traffic	4.0

** MAN77 is listed as urban background in the 2019 ASR. As it is only 2m from the kerb of the nearest road it has been relabelled here as urban traffic.*
*** distance to kerb for MAN 82/83/84 is 0.5m, which would classify this site as kerbside. However, this is distance from the cycleway. The distance to the kerb of the roadway is approximately 4m and therefore the site would be roadside.*

Recent NO_2 diffusion monitoring results from 2015 to 2019 are shown in Table 10. An exceedance is defined as an annual mean greater than 40µg/m^3 for NO_2. All exceedances of the objective thresholds are indicated in bold.

[40] https://cleanairgm.com/air-quality-data/diffusion-tubes.

Figure 6: Local Diffusion Tube Sites

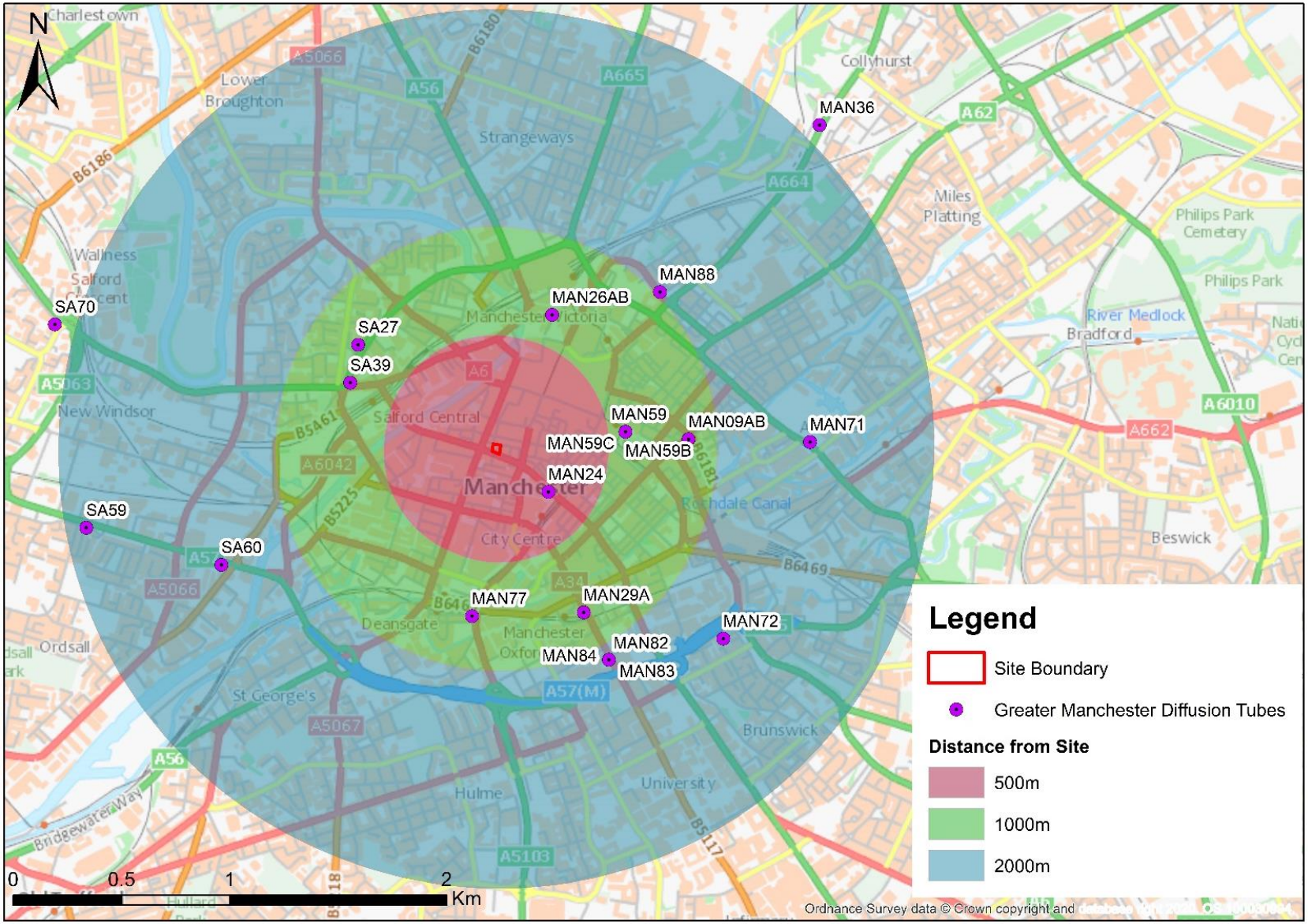


Table 10 Diffusion Tube Monitoring Results 2015 to 2019

Site ID	Site Type	Distance from Site (m)	Annual Mean NO_2 Concentration (µg/m³)				
			2015	2016	2017	2018	2019
MAN09AB	Kerbside	500m NE	**55.9**	**51.9**	**51.1**	**45.8**	**44.9**
MAN24	Kerbside	175m SW	**55.2**	**45.3**	**44.7**	**40.3**	**40.8**
MAN26AB	Urban background	630m NE	33.1	37.1	35.5	33.4	33.0
MAN29A	Urban traffic	800m SE	**56.4**	**66.2**	**57.7**	**58.8**	**55.4**
MAN59	Urban background	240m NE	35.9	38.5	36.3	32.2	33.1
MAN59B			35.8	**40.8**	35.7	31.6	
MAN59C			34.9	38	36.3	32.1	
MAN71	Urban traffic	1.4km E	**45.9**	**51.2**	**50.4**	**46.1**	**45.3**
MAN72	Urban background	1.3km SE	34.8	40.0	34.6	33.4	32.8
MAN77	Urban traffic	750m S	37.5	**44.2**	38.8	**41.0**	**43.7**
MAN82	Urban traffic	1km SE	**60.6**	**61.9**	**56.7**	**51.9**	**51.6**
MAN83			**61.1**	**62.8**	**55.1**	**52.5**	**50.4**
MAN84			**60.5**	**60.2**	**56.2**	**54.0**	**52.0**
MAN88	Urban traffic	1km NE	**52.2**	**57.8**	**57.9**	**46.8**	**45.2**
SA27	Urban traffic	750m NW	35.4	39	36.8	-	37.2
SA39	Urban traffic	700m NW	38.5	**46.8**	**41.6**	39.1	**41.7**
SA59	Urban traffic	1.9km SW	-	-	36.7	33.3	32.4
SA60	Urban traffic	1.3km SW	-	-	**40.7**	**40.2**	36.7

Exceedances of the annual mean air quality objective are indicated in **bold.**
Values greater than 60µg/m³ are underlined.
- no data available

Of the 14 diffusion tube monitoring locations, all but 2 of the urban traffic sites exceeded the NO_2 objective (40µg/m³) during the period between 2015 and 2019. MAN24 is located closest to the Proposed Development and recorded concentrations of 40.8µg/m³ in 2019. MAN24is located further along the A34 and therefore, from available data, considered to be most representative of roadside concentrations at the south of the site. It is anticipated that roadside concentrations at the north, east and west of the Proposed Development would be slightly lower due to lower traffic flows on these streets.

The annual mean NO_2 concentrations recorded at all of the sites within 2km between 2017 and 2019 are below 60µg/m³. Exceedances of the short-term objective are therefore considered to be unlikely.

4.3 Defra's Background Pollutant Concentration Mapping

Background concentrations refer to existing levels of pollution in the atmosphere, as a result of emission from a variety of sources, such as traffic, industrial and agricultural processes. Defra publishes background pollutant mapping for every 1km x 1km OS grid square across the UK for NO_x, NO_2, PM_{10} and $PM_{2.5}$. Background pollutant mapping has been reviewed for the grid square in which the Proposed Development lies and surrounding grid squares. The background concentrations (which are based on 2018 monitoring data) are presented in Table 11.

Table 11 Defra's 2019 background concentrations of NO_x, NO_2, PM_{10} and $PM_{2.5}$

OS Grid Square		Annual Mean Concentration (µg/m3)			
X	Y	NO_x	NO_2	PM_{10}	$PM_{2.5}$
382500	**398500**	32.4	22.0	12.5	8.2
383500	**397500**	39.9	26.1	13.5	8.7
383500	**398500**	44.6	28.2	13.1	8.5
383500	**399500**	31.4	21.4	12.4	8.1
384500	**398500**	47.0	29.3	13.6	8.8
Average		**39.1**	**25.4**	**13.0**	**8.5**

Defra background concentrations are all below the air quality objectives for annual mean NO_2 and PM_{10} and $PM_{2.5}$.

Table 12 shows the comparison between the measured NO_2 concentrations at the urban centre and background sites within 2km to the Proposed Development and the estimated Defra background concentrations for the same OS grid squares for NO_2, PM_{10} and $PM_{2.5}$ in 2019.

Comparison of the mapped background concentrations with those measured at urban background locations indicate that the use of monitored data is more conservative, presumably incorporating additional local sources.

Table 12 Comparison between 2018 monitored and Defra background concentrations

Pollutant	OS Grid Square		Estimated Defra background concentration (µg/m³)	2019 Measured concentration (µg/m³)	Difference	Difference (%)
	Easting	Northing				
MAN3 (Urban centre)						
NO_2	384500	398500	29.3	30	-0.7	-2.4
PM_{10}	384500	398500	13.6	20	-6.4	-47.1
$PM_{2.5}$	384500	398500	8.8	12	-3.2	-36.4
Urban background diffusion tubes						
MAN26AB	383500	398500	29.3	33.0	-3.7	-12.6
MAN59	384500	398500	29.3	31.6	-2.3	-7.8
MAN72	384500	397500	28.2	32.8	-4.6	-16.3

4.4 Local Traffic Data

The presence of any heavily trafficked roads, with emissions that could give rise to significantly higher concentrations of pollutants (e.g. NO_2), may cause unacceptably high exposure for users of the new development. Traffic count data for the area is reported in Appendix E. This includes traffic data for the John Dalton Street which forms the southern boundary of the Proposed Development.

There are several on-way streets in the area, to minimise traffic flows. These include Ridgefield, on western site boundary, and South King Street, on the northern site boundary.

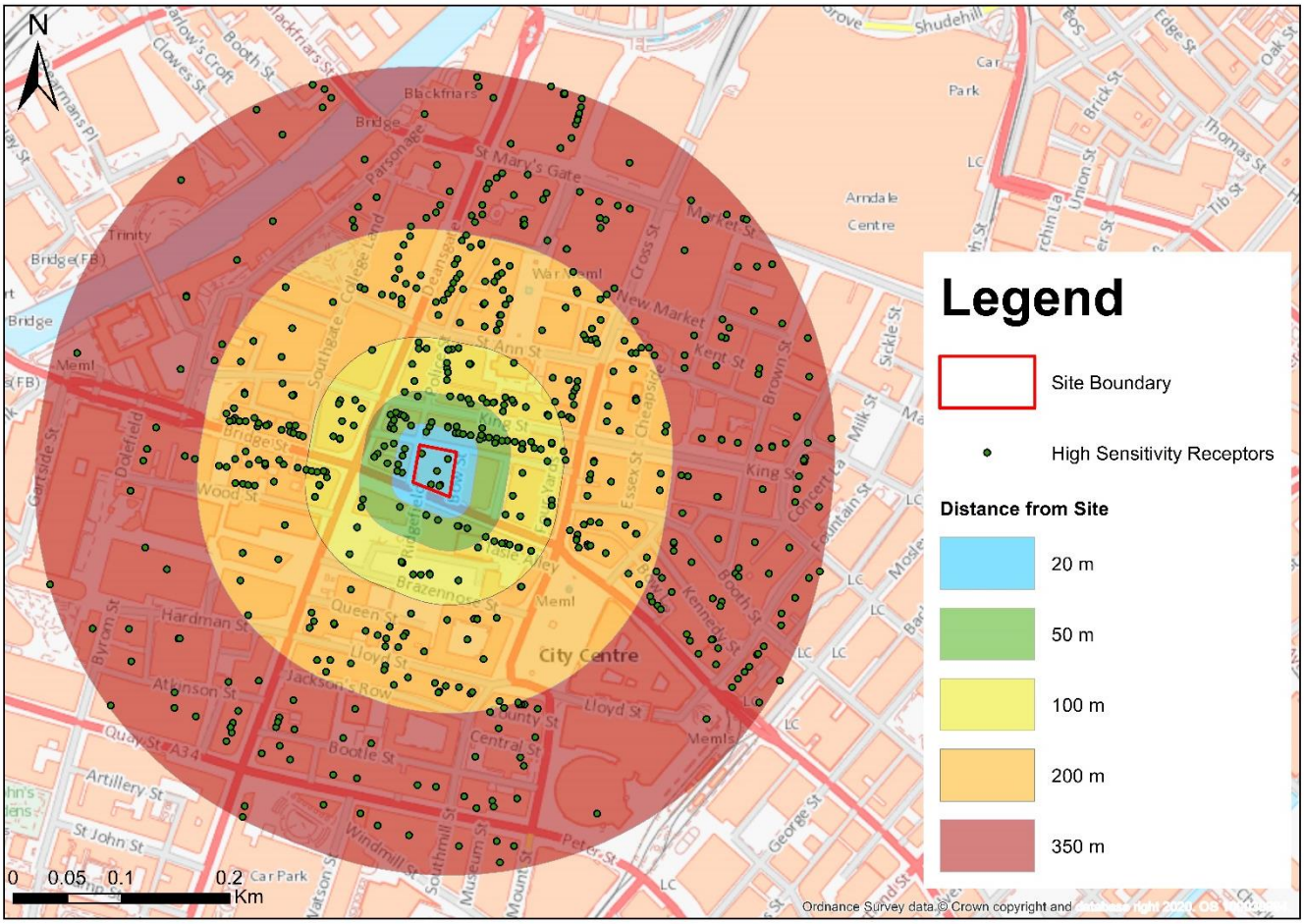
It is understood that the area is well used by pedestrians with many shops and restaurants on surrounding streets. The site is approximately a 5-minute walk from the Piccadilly Gardens Metrolink stop, and 4 minutes' walk from the Market Street and St Peter's Square stops respectively.

The emissions from roads in the area are assumed to be represented in the background concentration listed in section 4.3.

4.5 Sensitive Residential Receptors

The Site is located within a densely urbanised area. There are several properties surrounding the Site, identified in the Address Base Plus geographical data set. These include several receptors considered to be of high sensitivity, such as residential properties. High sensitivity receptors within 350m of the Proposed Site are shown on Figure 9.

Figure 7: Sensitive Receptor Locations



4.6 Future Baseline

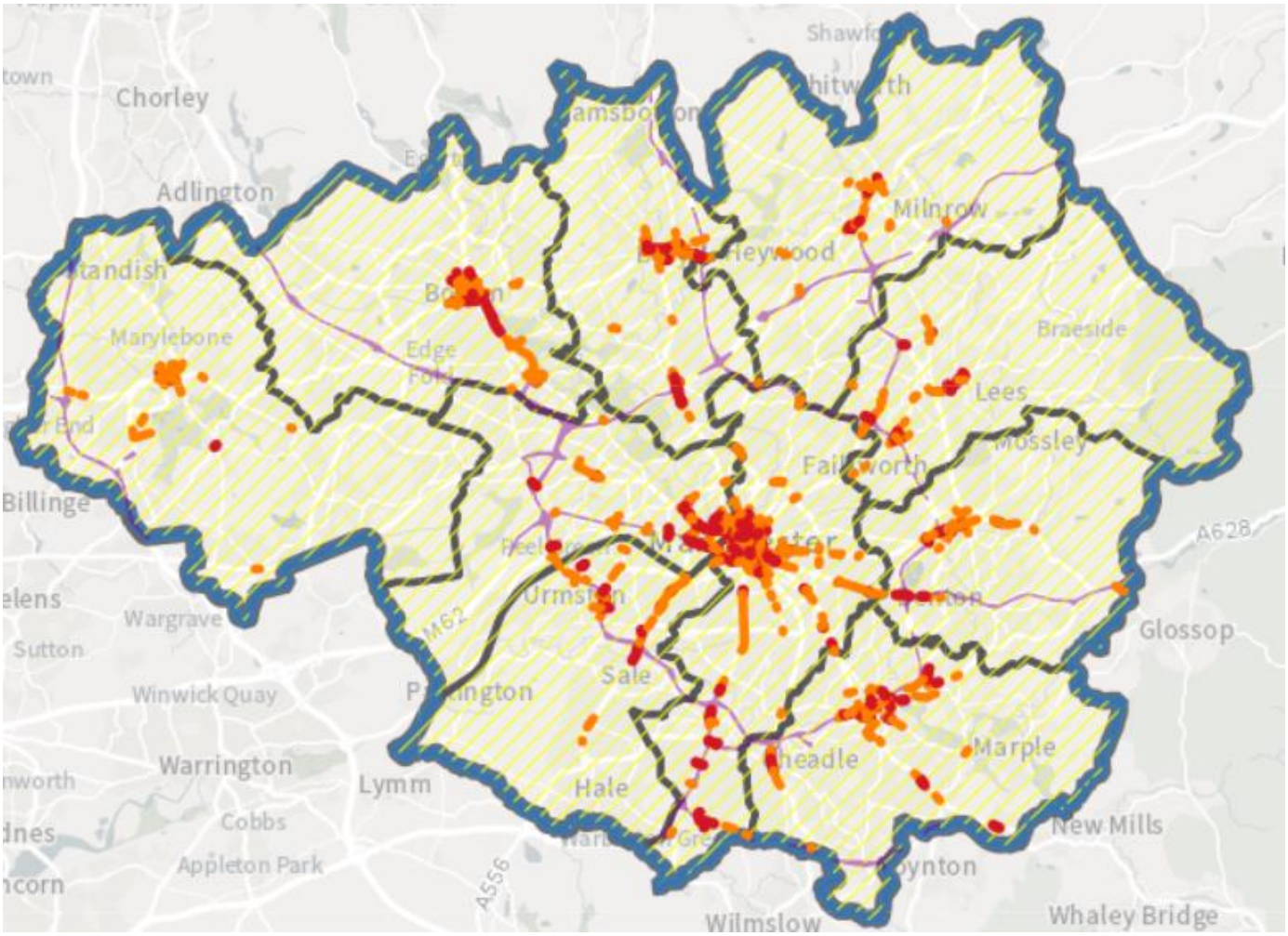
The UK Government has directed Greater Manchester to introduce a Category C Clean Air Zone (CAZ), with an aim of achieving statutory NO_2 Limit Values. In response, Greater Manchester has developed a Clean Air Plan to tackle harmful and illegally high levels of roadside air pollution across the city-region.

Review of the Clean Air Greater Manchester website[41] in March 2021 indicated that the CAZ is expected to be introduced in Spring 2022. Following a consultation in autumn 2020, work is currently in progress to understand the information gathered through consultation and the economic impact of Covid-19 on people land businesses, which may alter the level of funding needed. It is anticipated that the final Clean Air Plan will be put forward to decision makers in the ten Greater Manchester local authorities as soon as possible and no later than summer 2021.

Figure 8, courtesy of Clean Air Greater Manchester website[42], shows the extent of the CAZ (blue boundary). All roads within Greater Manchester will be included in the Clean Air Zone, with the exception of those roads managed by Highways England, such as motorways and trunk roads (shown in purple in Figure 8). Roads shown in red are expected to breach NO_2 legal limits beyond 2020 if no action is taken.

Given the location of the Proposed Development within the centre of the CAZ, it is anticipated that traffic emissions will reduce in the future due to the introduction of the CAZ.

Figure 8 Proposed Greater Manchester Clean Air Zone (CAZ)



[41] Clean Air Greater Manchester, Clean Air Plans https://cleanairgm.com/clean-air-plans
[42] Clean Air Greater Manchester, Clean Air Zone Map https://cleanairgm.com/clean-air-zone-map/

5.0

Impact Evaluation

5.0 Impact Evaluation

5.1 Construction Phase Impacts

5.1.1 Need for a Detailed Assessment

An assessment was undertaken as there are 'human receptors' within 350m of the boundary of the site; and 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance.

5.1.2 Risk of Dust Impacts Assessment

Dust Emission Magnitude Analysis

The dust emission magnitude is based on the scale of the anticipated work and classified as Table 13 below. Assumptions listed are based on indicative design information provided by the Cartwright Pickard.

Table 13 Determination of the potential dust emission magnitude

Stage	Relevant Definition	Highest Potential Dust Emission Magnitude
Demolition	• Existing demolition volume anticipated to be 20,000 m^3 to 50,000m^3 (estimated to be 22,000m^3) • Potentially dusty construction material includes concrete and masonry • Demolition activities 10m to 20m above ground level	Medium
Earthworks	• Estimated site area is <2,500m^2 (estimated to be approximately 1,320m^2).	Small
Construction	• Estimated total building volume is 25,000m^3 to 100,000 m^3 (estimated 42,150m^3) • Potentially dusty construction material (e.g. concrete)	Medium
Track out	• Potential for >10 HDV (>3.5 tonnes) outward movements in any one day • Trackout route assumed to be west along the A34. Unpaved route is <10m.	Medium

The highest dust emission magnitude is likely to be **Medium**.

5.1.3 Sensitivity of the Area

Using the IAQM guidance, the sensitivity of the surrounding area has been determined for dust soiling effects and human health effects, based on the receptor type and density, as well as low annual mean PM_{10} concentrations. The determined sensitivities for each phase of construction are summarised in Table C4 in Appendix C.

There are a number of buildings within the surrounding area which are likely to have range of sensitivities to dust soiling and health effects. The numbers of these receptors likely to be affected by demolition, earthworks and construction activities during the construction phase has been assessed. The analysis involved counting receptors, identified via the current Address Base Plus geographical data set, within each of the distance bands from the Proposed Development boundary. Buffers illustrating the assessment distances of 20, 50, 100, 200 and 350 metres from the Proposed Development boundary are illustrated in Figure 9. The analysis of sensitive receptors within each distance band is presented in Table 14.

Figure 9 Construction Dust Buffer Zones (courtesy of Google Earth)

Table 14 Number of Receptors in Each Distance Band

Distance (metres)	Receptor Type		T			
	Residential / Development (High)	Non-Residential Development (High)	Commercial / Retail / Office (Medium)	Commercial / Leisure / Transport (Low)	Ecological	Totals
20	0	26	28	1	0	**55**
50	25	74	60	7	0	**166**
100	58	195	150	19	0	**422**
200	154	493	518	53	0	**1,218**
350	650	885	1,067	137	0	**2,739**

In summary, the evaluation shows that:

- 10-100 high risk receptors are located within 20m of the Proposed Development boundary
- >100 high risk residential receptors are located within 50m of the Proposed Development boundary

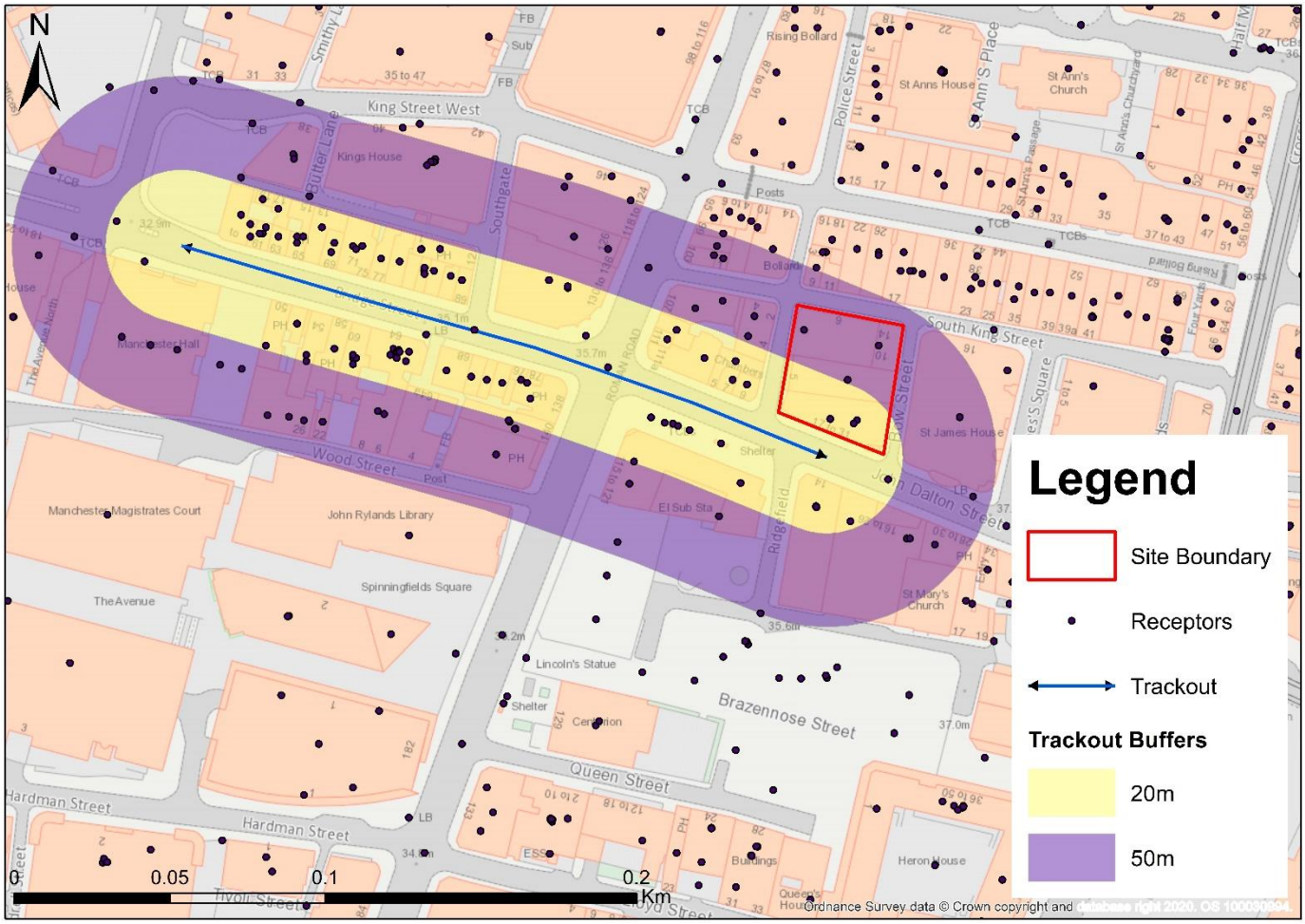
The sensitivity of the area to dust soiling effects on people and property from demolition, earthworks and construction activities is therefore **High**.

Defra MAGIC mapping[43] has been reviewed to determine the presence of any sensitive ecological sites[44]. There are no designated ecological receptors sensitive to dust within 350m of the site boundary and therefore the sensitivity of the area to ecological receptors is negligible.

The Defra PM_{10} background concentration in the area of the Proposed Development is 13.1µg/m^3. There are 10-100 high sensitivity receptors within 20m of the Proposed Development boundary. The sensitivity of the area to human health impacts for earthworks and construction activities is therefore **Low**.

Sensitive receptors are also susceptible to dust soiling and health effects resulting from construction vehicle trackout. The IAQM guidance states that trackout may occur from roads up to 500 m from large sites and 200m from medium sites. A 200m distance band has therefore been applied accounting for sensitive receptors 50m from the construction route (Figure 10). It is assumed that construction vehicles will trackout towards the west along the A34 John Dalton Street.

Figure 10 Trackout 500m Distance Band around the Site Exit Route



An evaluation of numbers of sensitive receptors lying within 20m and 50m of the assumed trackout route within 200m of the Proposed Development areas has been carried out. An evaluation of numbers of sensitive receptors lying within 20m and 50m of the edge of the carriageway of A34 within 200m of the site exit has been carried out and the number of these receptors likely to be affected by trackout on roads used by construction vehicles is summarised in Table 18.

[43] Department for Environment, Food and Rural Affairs (Defra) (2019). MAGIC https://magic.defra.gov.uk/MagicMap.aspx
[44] Typical ecological receptors of significance include Special Conservation Areas (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs), RAMSAR sites, Local Nature Reserves with dust sensitive features.

Table 15 Number of Receptors Identified in Distance Bands from the Edge of Carriageways Potentially Included in Construction Traffic Routes

Distance (metres)	Receptor Type					
	Residential / Development (High)	Non-Residential Development (High)	Commercial / Retail / Office (Medium)	Commercial / Leisure / Transport (Low)	Ecological	Totals
20	187	3	1	187	0	191
50	276	10	5	276	0	291

In summary, the evaluation shows that:

- >100 high risk receptors are located within 20m of the potential construction traffic routes
- >100 high risk receptors are located within 50m of the of the potential construction traffic routes

The sensitivity of the area to dust soiling effects on people and property from trackout activities is therefore **High**.

The Defra PM_{10} background concentration in the area of the Proposed Development is 13.1µg/m^3. There are >100 high sensitivity receptors within 20m of the construction phase boundary of roads used by construction traffic within 200m of the Site exit. The sensitivity of the area to human health impacts for trackout activities is therefore **Medium.**

Sensitivity of Areas Analysis

The sensitivity of the receptors and area has been defined for both dust soiling and human-health impact as shown in Table 16.

Table 16 Determination of the sensitivity of the surrounding area

Receptor Sensitivity	Sensitivity of the Receptors	Relevant Definition	Sensitivity of the Area
Dust Soiling for Demolition, Earthworks, Construction	High	10-100 high sensitivity receptors within 20m of site.	High
Dust Soiling for Trackout	High	>100 receptors within 20m of route used by construction traffic.	High
Human-Health Effects of PM_{10} for Demolition, Earthworks, Construction	High	<24 µg/m^3 annual mean PM_{10} concentration. 10-100 high sensitivity receptors within 20m of site.	Low
Human-Health Effects of PM_{10} for Trackout	High	<24 µg/m^3 annual mean PM_{10} concentration. >100 receptors within 20m of route used by construction traffic	Medium

5.1.4 Risk of Impact

The risk of dust impact to both dust soiling and human-health effects for each construction activities are summarised in Table 17.

Table 17 Risk of Impacts

Potential Impact (Sensitivity of the Area)	Dust Risk (Dust Emission Category)				
	Demolition (Medium)	Earthworks (Small)	Construction (Medium)	Trackout (Medium)	Overall Risk
Dust Soiling (High for Demolition, Earthworks, Construction and Trackout)	Medium	Medium	Medium	Medium	Medium
Human-health (Low for Demolition, Earthworks, and Construction and Medium for Trackout)	Low	Negligible	Low	Low	Low
Overall Risk	Medium	Medium	Medium	Medium	**Medium**

The dust impact assessment has demonstrated that the risk of dust soiling without any mitigation is Medium for demolition, earthworks, construction and trackout.

The risk of adverse human-health effects of PM_{10} without any mitigation is Low for demolition, construction and trackout and Negligible for earthworks.

The overall risk of unmitigated impacts is **Medium** for demolition earthworks, construction and trackout.

The dust emission category for trackout is based on the assumption that daily heavy good vehicles (HGVs) will not exceed 50. Should there be more than 50 daily HGVs travelling to the site during the constitution period, high risk mitigation measures would be required for trackout. In comparison with medium risk measures, dust suppressants would be required at locations where a large volume of vehicles enter and exit the construction site.

5.2 Operation Phase Impacts

5.2.1 Human Exposure

Air quality conditions for future site users of the Proposed Development have been qualitatively assessed using the information presented in Table 6, Table 7, Table 8, Table 10 and Table 11 and worst-case concentrations have been estimated as follows:

- 2019 Modelled NO_2: <30 µg/m^3; 2019 monitored 40.8µg/m^3
- 2019 modelled PM_{10}: <14 µg/m^3 and monitored PM_{10}: <31 µg/m^3
- 2019 modelled $PM_{2.5}$: <9 µg/m^3 and monitored $PM_{2.5}$ <13 µg/m^3

The annual mean PM_{10} and $PM_{2.5}$ concentrations are therefore predicted to meet the air quality objective threshold values in the opening year. Excluding a marginal exceedance in 2018, the monitored concentrations at the urban centre site have not exceeded the WHO target of 20µg/m^3, which Greater Manchester is aiming to achieve by 2030 (see section 2.1). Concentrations at the urban traffic site on Oxford Road have been above the WHO target in recent years, with a maximum of 30µg/m^3 recorded in 2018. Monitored concentrations of $PM_{2.5}$ have also been close to or only marginally above the WHO target of 10µg/m^3, which Greater Manchester is aiming to achieve by 2030 (see section 2.1). It is anticipated with the induction of the Clean Air Zone in 2022 (see section 4.6), particulate concentrations will reduce further.

The monitored NO_2 concentrations listed above are based on 2019 roadside monitoring at the nearest monitoring site, MAN24 further along the A34. As the south façade is located on the A34, John Dalton Street, it is anticipated that NO_2

concentrations would be similar to MAN24 concentrations at roadside locations in the south boundary of the site. Traffic flows are anticipated to be lower on roads to the west, north and east of the site, in particular due to the presence on-way streets. Annual mean NO_2 concentrations at MAN24 have demonstrated a long-term decline between 2015 and 2019, reduced to marginally above the objective (40µg/m^3) by 2019 (40.8µg/m^3). It is anticipated that concentrations in the area will reduce further in the future, due to reduced traffic emissions associated with the implementation of the CAZ, due in 2022. It is therefore expected that NO_2 concentrations at the facades of the building will be compliant with the annual mean objective by the opening of the Proposed Development.

As the Proposed Development has a commercial use, short-term rather than long-term objectives will apply for the future site users. Since the estimated NO_2 value is predicted to be well below 60 µg/m^3, it is concluded that there are unlikely to be any exceedances of the NO_2 1-hour mean objective at the Proposed Development.

5.2.2 Road Traffic Emission Impacts at Nearby Receptors

No car parking is proposed as part of the development. The actual change in LDV flows is therefore anticipated to be well below 100 vehicles per day, the threshold value at which the IAQM predicts significant impacts are likely to occur. The predicted impact on NO_2, PM_{10} and $PM_{2.5}$ concentrations is therefore considered to be Negligible at all nearby receptors.

6.0

Assumptions and Limitations

6.0 Assumptions and Limitations

The following assumptions have informed this assessment:

- As no car parking is included within the Proposed Development, operational traffic flows anticipated to be well below the threshold for within an AQMA (100 annual average daily traffic (AADT)).
- Assumptions relating to quantities for construction are based on the design details provided by Cartwright Pickard.
- Based on the size of the Proposed Development, it is assumed that daily construction vehicles will not exceed 50 heavy good vehicles (HGVs). This may be overly conservative if prefabrication is included within the construction. Should daily HGVs exceed 50, high risk mitigation measures would be required for trackout activities.
- Energy provision for the Proposed Development is to be sourced from electricity via a new substation constructed within the building. There will be an emergency standby diesel generator for the office floors, located at roof level (36m). As space has been allocated for a similar sized tenant standby generator at ground floor level, with flue at high level ground floor on the centre of the eastern façade. Each generator is anticipated to each operate a total of 26 hours per year (associated with 30-minute weekly testing).
- Opening louvers are to be provided to all floors to allow natural ventilation to the office space. Indoor air quality testing is likely to be carried out as part of BREEAM accreditation and can provide operational data on indoor air quality.
- The ventilation strategy for the rental space (ground floor and basement) would need to be agreed by the tenant. A planning condition could be agreed with Manchester City Council relating to the detailed specification of the ventilation strategy . Comments and recommendations have been provided in this report.

7.0

Mitigation

7.0 Mitigation

7.1 Construction

The primary aim of the dust risk assessment is to identify the appropriate site-specific mitigation measures that will be adopted to ensure there will be no significant effect on local amenity and public health.

Full details of mitigation measures are presented in Appendix H and should be read in accordance with the findings of the construction dust assessment (section 5.0).

It is anticipated that the dust generation and harmful emissions from construction site activities will be greatly reduced or eliminated with the correct implementation of the best practice methods identified.

7.2 Operation

It is anticipated that the impact of the operation phase on future office users is likely to be negligible, and therefore no mitigation measures are required. Opening louvers are to be provided to all floors to allow natural ventilation to the office space. Indoor air quality testing is likely to be carried out as part of BREEAM accreditation. This will provide useful information on the indoor air quality within the office space and an opportunity to inform the acceptability of the ventilation strategy for the office floors. Under these conditions, it is anticipated that the exposure of future office users to poor air quality will be unlikely, and no additional mitigation measures will be required.

There is potential for slight exceedances of annual mean NO_2 concentrations at building facades at ground floor level, and in particular on the southern façade, John Dalton Street, A34. The ventilation strategy for the rental space (ground floor and basement) would need to be agreed by the tenant. A planning condition could be agreed with Manchester City Council relating to the detailed specification of the ventilation strategy. It is anticipated that the ground floor and basement ventilation to the building will be based on a minimum fresh air system using mechanical ventilation with heat recovery (MVHR). MVHR intakes should be positioned on away from the standby generator flue (eastern façade) and busier road (John Dalton Street). Manchester City Council in their planning response[45] highlighted the requirement for flues to terminate at least 1m above the eaves level and/or any openable windows/ventilation intakes of nearby properties. The requirement for internal ducting in risers that terminate at roof level was also highlighted.

Consideration should be given to integrating particulate filters into the MVHR design where this is practicable. Whereas $PM_{10/2.5}$ filtration is unlikely to be required for planning (as it considers exceedances of national air quality objectives) it is recommended to be considered for good practice design (as Building Regulations often consider WHO guidelines which are usually more stringent), see Table 18 below. Worst case predicted concentrations of PM_{10} and $PM_{2.5}$ (31µg/m^3 and 13µg/m^3, respectively) are above the WHO guidelines of 20µg/m^3 and 10µg/m^3, respectively. Openable windows could potentially be utilised for purge or natural ventilation purposes. Any intakes and openable windows should not be located close to the proposed generator flue location (central eastern façade).

Table 18: Comparison of WHO Guidelines with National Air Quality Objectives

Pollutant	Averaging Period	Air Quality Objective (AQO) (µg/m^3)	WHO Guidelines (µg/m^3)
NO_2	Annual mean	40	40
PM_{10}	Annual mean	40	20

[45] Deloitte Real Estate (2021), Planning response for application 129251/FO/2021, 22nd March 2021

$PM_{2.5}$	Annual mean	25	10

For commercial kitchen within the building, a kitchen fume extract strategy report will need to be submitted to Manchester City Council for approval, as highlighted by. Manchester City Council highlighted in their planning response[44].

9.0

Conclusion

8.0 Conclusion

This report presents the air quality assessment for the proposed 10-storey plus basement office building with flexible ground floor and basement uses and a rooftop garden on the land bound by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester. A review of current legislation and national and local policy has been made. An assessment has been made of existing baseline air quality conditions and potential impacts associated with construction and operational of the Proposed Development.

The proposed development lies within Greater Manchester's Air Quality Management Area (AQMA), which was declared in 2000 due to exceedances of the annual mean nitrogen dioxide (NO_2) objective threshold and 24-hour particulate matter (PM_{10}) objective. Existing conditions within the study area indicate that there is potential for nitrogen dioxide (NO_2) concentrations in the wider area to exceed the European Limit Value and National Air Quality Objective threshold levels.

Emissions of construction dust have been assessed using the qualitative approach outlined in the IAQM guidance. It was concluded that in the absence of any adequate mitigation, there is a *medium* risk from the demolition, earthwork, construction and trackout dust-generating activities an associated with the Proposed Development. Trackout risk assessment is based on the assumption that daily HGVs travelling to the site during the constitution period will not exceed 50. Should there be greater than 50 daily HGVs during construction, high risk mitigation measures would be required for trackout. In comparison with medium risk measures, dust suppressants would be required at locations where a large volume of vehicles enter and exit the construction site. With appropriate mitigation measures implemented for all dust generating activities, it is anticipated that the dust generation and harmful emissions from construction site activities will not be significant.

Operation phase impacts are expected to be is likely to be negligible. No car parking is included within the development proposals, so operational traffic is anticipated to limited to delivery vehicles and taxis. Cycle parking and welfare facilities are included within the Proposed Development to encourage sustainable travel. It is understood the area is well used by pedestrians and is located a short walk from Metrolink stops.

Energy requirements for the development will be provided by electricity, via the new substation to be installed within the building. There will be diesel standby generator for emergency use for the office floors, located at roof level (36m). Space has been allocated for a similar standby for the tenant, at ground floor level, with flue at high level ground floor on the centre of the eastern façade. Each generator is anticipated to each operate a total of 26 hours per year (associated with 30-minute weekly testing. The nitrogen dioxide (NO_2) process contributions for the generators are well below the long-term and short-term criteria, indicating that the NO_2 emissions are unlikely to give rise to significant impacts. Dispersion modelling has therefore not been carried out.

It is anticipated that the impact of the operation phase on future office users is likely to be negligible, and therefore no mitigation measures are required. Opening louvers are to be provided to all floors to allow natural ventilation to the office space. Indoor air quality testing is likely to be carried out as part of BREEAM accreditation and can provide operational data on indoor air quality to inform the acceptability of the ventilation strategy for the office floors.

There is potential for slight exceedances of annual mean NO_2 concentrations at building facades at ground floor level, and in particular on the southern façade, John Dalton Street, A34. The detailed ventilation strategy for the flexible ground floor and basement commercial space would need to be agreed by the tenant. A planning condition could be agreed with Manchester City Council relating to the detailed specification of the ventilation strategy. It is likely to comprise mechanical ventilation with heat recovery (MVHR) and should consider the provision of the provision of $PM_{10/2.5}$ filtration as best practice. An intakes and openable windows should not be located close to the proposed generator flue location (central eastern façade) and the busiest street (John Dalton Street, A34).

With the provision of the recommendation mitigation measures, it can be concluded that there are no air quality constraints to the construction and operation of the Proposed Development.

10.0

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11.0

Glossary

10.0 Glossary

Term/Acronym	Details
µg/m^3	Micrograms (one-millionth of a gram) per cubic metre of air
AADT	Annual average daily traffic
AQAL	Air Quality Assessment Level
AQAP	Air quality action plan
AQMA	Air quality management area. Areas where the air quality objectives are likely to be exceeded. Declared by way of an order issued under the Section 83(1) of the Environment Act 1995.
AQO	Air quality objective. Air quality targets to be achieved locally as set out in the Air Quality Regulations 2000 and subsequent Regulations. Objectives are expressed as pollution concentrations over certain exposure periods, which should be achieved by a specific target date. Some objectives are based on long term exposure (e.g. annual averages), with some based on short term objectives. Objectives only apply where a member of the public may be exposed to pollution over the relevant averaging time.
AQS	Air quality strategy
ASR	Annual status report
CURED	Calculator Using Realistic Emissions for Diesels
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
Earthworks	The process of soil stripping, ground-levelling, excavation and landscaping.
EfT	Emission Factor Toolkit
EU	European union
Exceedance	Concentrations of a specified air pollutant greater than the appropriate Air Quality Objective.
HDV	Heavy duty vehicle
IAQM	Institute of Air Quality Management
LA	Local authority
LAQM	Local air quality management
LAQM, TG	Local air quality management technical guidance
LDV	Light duty vehicle
Limit Values / EU limit values	The maximum pollutant levels set out in the EU Daughter Directives on Air Quality. In some cases, the limit values are the same as the national air quality objective but may allow a longer period for achieving.
LT	Long-term averaging period (i.e. Annual mean)
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
PCM	Pollution climate model
PM_{10}	The fraction of particulates in air of very small size (less than 10 micrometres).
$PM_{2.5}$	Fine particles in the (ambient) air 2.5 micrometres or less in size.
Ramsar/ Ramsar site	The Convention on Wetlands of International Importance, called the Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Ramsar sites are wetlands of international importance, designated under the Ramsar Convention.
SAC/ pSAC/ cSAC	Special area of conservation / potential SAC / candidate SAC
SPA / pSPA	Special protection area / potential special protection area
SPG	Supplementary planning guidance
SSSI	Site of special scientific interest

Term/Acronym	Details
ST	Short-term averaging period (i.e. Daily, hourly, or 15-min means)
TC	Transport Consultant
TEMPRO	Trip End Model Presentation Program
TP	Travel Plan
Trackout	The transfer of dust or dirt on the local road network and then re-suspended by vehicles on the network.
TS	Transport Statement
WHO	World Health Organisation

Appendices

Appendix A Air Quality Assessment Authors

Author: **Jenny Carrington**

Jenny Carrington is a Chartered Scientist (CSci) and is based in Birmingham, where she works as a Principal Air Quality Consultant.

Jenny has sixteen years' experience working in the environmental sector for a range of both public and private clients.

She is responsible for undertaking air quality assessments and is fully conversant with atmospheric dispersion modelling through the use of ADMS software as part of more detailed air quality assessments. She also has responsibility for managing air quality monitoring programs.

In her role as an environmental specialist Jenny has worked on a range of multi-disciplinary projects often fulfilling the role of project manager in coordinating third parties to enable a successful completion of the project.

She is experienced in producing air quality chapters for Environmental Statements for a range of different developments and has previously reviewed Environmental Statement's on behalf of Local Authorities.

Reviewer: **Glyn Hodgkiss**

Glyn is a Principal Consultant in Cundall's Air Quality Team. He has 30 years' experience working in the environmental field and has specialised in Air Quality for over 15 years. He is a Chartered Environmentalist and Member of the Institute of Air Quality Management.

Working in both the private and public sectors, Glyn has gained extensive experience in monitoring and modelling air quality. His role in Local Government included air quality action planning, working with developers to minimise air quality impacts of new development, working on regional planning policy initiatives and on the delivery of government funded air quality improvement programs. He has also worked in private sector consultancy on the delivery of multiple air quality assessments ranging from small, single source dispersion modelling studies through to complex multi-source assessments and major road and infrastructure projects. This work has provided valuable support in the design, planning, construction and operation of new developments.

Glyn has a pedigree in collaborative working, bringing together the expertise of Cundall alongside other consultants and stakeholders to

Appendix B Scoping Correspondence

19th March 2021

From: Carrington, Jenny
Sent: 19 March 2021 10:23
To: 'R.Twigg@manchester.gov.uk' <R.Twigg@manchester.gov.uk>; 'g.souter@manchester.gov.uk' <g.souter@manchester.gov.uk>; 'l.miller@manchester.gov.uk' <l.miller@manchester.gov.uk>
Cc: Hodgkiss, Glyn <g.hodgkiss@cundall.com>
Subject: The Island - Air quality assessment

Dear Rebecca, Graeme, Laura

Cundall has been commissioned to carry out an air quality assessment in relation the redevelopment of a site known as The Island, which the area surrounded by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester, within the Greater Manchester AQMA. Proposals are for the demolition of three existing buildings: 5 Ridgefield, Grange House and Old Colony House and the erection of a 12-storey building with office and commercial space.

The building is being designed to achieve BREEAM 2018 accreditation. Energy needs will be met by electricity, with a new substation being installed within the basement. Heat pumps will be used to heat the water. There will be an emergency diesel generator, with flue located on the roof. With maintenance testing, this generator is not likely to operate more than 50 hours a year. Anticipated testing hours are 30 mins per week, so 24 hours per year. We are not proposing to carrying out an detailed modelling of generator emissions.

The building will have mechanical heat recovery. Opening louvers will be on all floors to allow natural ventilation to be used. As part of BREEAM 2018 accreditation, indoor air quality testing is to be carried out post construction.

The proposed development does not include any car parking and will include ground floor cycle parking. The transport planners (Mode) have therefore informed us they will not be carrying out any junction work or baseline traffic surveys but will be able to provide us with a net change in trips generation associated with the redevelopment.

We are therefore proposing the following scope of work:

- Baseline assessment of existing air quality in the area using findings the Local Authority review and assessment process and data available from the Defra Local Air Quality Management website. We have obtained a copy of the Greater Manchester ASR 2019 and reviewed the Clean Air Greater Manchester website for 2019 data.
- An assessment of new exposure at the Proposed Development in accordance with IAQM/EPUK guidance. This will be based on existing baseline conditions, using available Greater Manchester monitoring data in the area and Defra background predictions. Consideration that given the commercial nature of the development, the short-term, rather than long-term objectives are applicable. We are also aware of the site's location within the proposed Clean Air Zone.
- Undertaking a construction dust risk assessment following the latest Institute of Air Quality Management (IAQM) guidance;
- Where appropriate, recommending appropriate mitigation measures in line with IAQM/EPUK guidance and Local policy; and
- Preparation of a report to accompany the documents for the planning application.

If you disagree with any elements of the proposed scope please let me know, otherwise I will proceed with the assumption it is acceptable.

Thank you for your assistance in this matter and feel free to call me with any further queries.

Kind Regards,

Jenny

Jenny Carrington
Principal Air Quality Consultant
Cundall

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24th March 2021

From: Lisa Jones <lisa.jones3@manchester.gov.uk>
Sent: 24 March 2021 13:55
To: Carrington, Jenny <j.carrington@cundall.com>
Subject: The Island - Air quality assessment

Good afternoon,

I have reviewed the proposed AQ assessment methodology for the above and we have no additional comments at this time.

Kind regards

Lisa Jones

Environmental Protection

Environmental Health

The Neighbourhoods Directorate

Manchester City Council

Tel: 0161 234 5004

email: lisa.jones3@manchester.gov.uk

website: www.manchester.gov.uk

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Appendix C IAQM Construction Assessment Methodology

Screening (Step 1)

As 'human receptors' were identified within 50 m of the boundary of the site; and within 50 m of the route(s) to be used by construction vehicles on the public highway, up to 500 m from the site entrance, a detailed risk assessment was undertaken.

Dust Emission (Step 2A)

The potential dust emission magnitude for different activities have been defined based on the criteria listed in Table C1.

Table C1 Potential Dust Emission Magnitude Criteria

Stage	Description	Large	Medium	Small
Demolition	Definitions for demolition are:	1. Total building volume >50,000 m^3 2. Potentially dusty construction material (e.g. concrete) 3. On-site crushing and screening 4. Demolition activities >20 m above ground level	5. Total building volume 20,000 m^3 – 50,000 m^3 6. Potentially dusty construction material (e.g. concrete) 7. Demolition activities 10 – 20 m above ground level	8. Total building volume <20,000 m^3 9. Construction material with low potential for dust release (e.g. metal cladding or timber) 10. Demolition activities <10 m above ground, demolition during wetter months
Earthworks	Earthworks will primarily involve excavating material, haulage, tipping, and stockpiling. This may also involve levelling the site and landscaping.	11. Total site area >10,000 m^2 12. Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) 13. >10 heavy earth moving vehicles active at any one-time formation of bunds >8 m in height 14. Total material moved >100,000 tonnes	15. Total site area 2,500 m^2 – 10,000 m^2 16. Moderately dusty soil type (e.g. silt) 17. 5-10 heavy earth moving vehicles active at any one-time formation of bunds 4 m – 8 m in height 18. Total material moved 20,000 tonnes – 100,000 tonnes	19. Total site area <2,500 m^2 20. Soil type with large grain size (e.g. sand) 21. <5 heavy earth moving vehicles active at any one-time formation of bunds <4 m in height 22. Total material moved <20,000 tonnes, earthworks during wetter months
Construction	The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s) / infrastructure, method of construction, construction materials, and duration of build.	23. Total building volume >100,000 m^3 24. On-site concrete batching and sandblasting	25. Total building volume 25,000 m^3 – 100,000 m^3 26. Potentially dusty construction material (e.g. concrete) 27. On-site concrete batching	28. Total building volume <25,000 m^3 29. Construction material with low potential for dust release (e.g. metal cladding or timber)

Stage	Description	Large	Medium	Small
Trackout	Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology, and duration. Only receptors within 50 m of the routes used by vehicles on the public highway and up to 500 m from the site entrances are considered to be at risk from the effects of dust.	30. >50 HDV (>3.5 tonnes) outward movements in any one day 31. Potentially dusty surface material (e.g. high clay content) 32. Unpaved road length >100 m	33. 10-50 HDV (>3.5 tonnes) outward movements in any one day 34. Moderately dusty surface material (e.g. high clay content) 35. Unpaved road length 50 m – 100 m	36. <10 HDV (3.5 tonnes) outward movements in any one day 37. Surface material with low potential for dust release 38. Unpaved road length <50 m

Sensitivity of the Area (Step 2B)

The sensitivity of the area takes account of several factors:

1. The specific sensitivities of receptors in the area;
2. The proximity and number of those receptors;
3. In the case of PM_{10}, the local background concentration; and
4. Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table C2 provides guidance on the sensitivity of different types of receptor.

Table C2 Sensitivities of People to Dust Soiling Effects, Health Effects of PM_{10}, and Sensitivities of Receptors to Ecological Effects

Description	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of People to Dust Soiling Effects	1. Users can reasonably expect enjoyment of a high level of amenity 2. The appearance, aesthetics, or value of their property would be diminished by soiling 3. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land 4. Indicative examples include dwellings, museums, and other culturally important collections, medium, and long-term car parks, and car showrooms	5. Users would expect a to enjoy a reasonable level of amenity, but would not reasonably expect a to enjoy the same level of amenity as in their home 6. The appearance, aesthetics, or value of their property could be diminished by soiling 7. The people or property wouldn't reasonably be expected a to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land 8. Indicative examples include parks and places of work	9. The enjoyment of amenity would not reasonably be expected; or 10. Property would not reasonably be expected a to be diminished in appearance, aesthetics, or value by soiling 11. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land 12. Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short-term car parks, and roads
Sensitivities of People to the Health Effects of PM_{10}	13. Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) 14. Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment	15. Locations where the people exposed are workers d, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). 16. Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation	17. Locations where human exposure is transient. 18. Indicative examples include public footpaths, playing fields, parks, and shopping streets

Description	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of Receptors to Ecological Effects	19. Locations with an international or National designation and the designated features may be affected by dust soiling 20. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain 21. Indicative examples include a Special Area of Conservation designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings	22. Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown 23. Locations with a National designation where the features may be affected by dust deposition 24. Indicative example is a Site of Special Scientific Interest with dust sensitive features	25. Locations with a local designation where the features may be affected by dust deposition. 26. Indicative example is a local Nature Reserve with dust sensitive features

Full details of the sensitivities of receptors are provided in the IAQM Guidance document.

Table C3, Table C4, and Table C5 show how the sensitivity of the area has been determined for dust soiling, human-health, and ecosystem impacts respectively.

These tables take account of several factors which may influence the sensitivity of the area. The highest level of sensitivity from each table has been recorded.

Table C3 Sensitivity of the Area to Dust Soiling Effects on People and Property

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

Table C4 Sensitivity of the Area to Human-Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration (µg/m³)	Number of Receptors [d]	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<28	>10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table C5 Sensitivity of the Area to Ecological Impact

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

The highest level of sensitivity from each table has been recorded. Professional judgement has been used to determine alternative sensitivity categories with consideration of additional factors, such as any pre-existing screening between the source and the receptors, the season during which the works will take place, and duration of the potential impact.

Risk of Impact Definition

The dust emission magnitude (Step 2A) was combined with the sensitivity of the area (Step 2B) to determine the risk of impact with no mitigation applied. Tables C6 – C9 provide the method of assigning the level of risk of each activity and used to determine the level of site-specific mitigation.

Table C6 Risk of Impact – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	High risk	Low risk	Low risk
Low	Low risk	Low risk	Negligible

Table C7 Risk of Impact – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table C8 Risk of Impact – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table C9 Risk of Impact – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	Medium risk	Low risk	Low risk
Low	Low risk	Low risk	Negligible

Appendix D IAQM Local Air Quality Assessment Screening Criteria

Comparison Against IAQM Criteria

IAQM's guidance note 'Land-Use Planning & Development Control: Planning for Air Quality' (updated in January 2017) was issued to ensure that air quality is adequately considered in the land-use planning and developmental control process.

It provides a decision-making process which assists with the understanding of air quality impacts and implications because of development proposals. It provides a framework for air quality considerations within local development control processes, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant.

The guidance also provides some clarification as to when air quality constitutes a material consideration and highlights the links to other relevant issues (for example traffic speed reduction measure and the use of alternative technology to provide energy) and the importance of the understanding of these with the input from other discipline specialists. The 'creeping baseline' is another issue raised about cumulative impacts.

The guidance note is widely accepted as the most appropriate reference method for this purpose. This guidance refers to the Town and Country Planning (Development Management Procedure) Order (England) 2010 [(Wales) 2012] definition of a 'major' development when scoping assessments required for the planning process.

A 'major' development includes developments where:

- The number of dwellings is 10 or above;
- The residential development is carried out of a site of more than 0.5ha where the number of dwellings is unknown;
- The provision of more than 1,000m^2 commercial floor space; or,
- Development carried out on land of 1ha or more.

There are two types of air quality impacts to be considered:

- The impact of existing sources in the local area on the Proposed Development (governed by background pollutant levels and proximity to sources of air pollution); and,
- The impacts of the Proposed Development on the local area.

Regarding the changes in air quality or exposure to air pollution, the guidance indicates that each local authority will be likely to have their own view on the significance of this; these are to be described in relation to whether a National Air Quality Objective (NAQO)predicted to be met, or at risk of not being met. Exceedances of these objectives are considered as significant, if not mitigated.

As part of the impact of the Proposed Development on the local area, a two-staged assessment is recommended as per current guidance.

Stage 1: Determines whether an air quality assessment is required. In order to proceed to Stage 2, it requires any of the criteria under (A) coupled with any of the criteria under (B) in Table D1 to apply.

Stage 2: Where an assessment is deemed appropriate, this may take the form of a Simple Assessment or a Detailed Assessment, using suitable guidance provided in Table D2.

Table D1 Stage 1 Criteria

Criteria to Proceed to Stage 2
A. If any of the following apply: • 10 or more residential units of a site area of more than 0.5ha • More than 1,000m^2 of floor space for all other uses or a site area greater than 1ha
B. Coupled with any of the following: • The development has more than 10 parking spaces • The development will have a centralised energy facility or other centralised combustion process **Note:** Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

Table D2 Indicative Criteria for Requiring an Air Quality Assessment

The Development will	Indicative Criteria to Proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic slows on local roads with relevant receptors. **(LDV = cars and small vans <3.5t gross vehicle weight).**	A change of LDV flows of: • More than 100 AADT within or adjacent to an Air Quality Management Area (AQMA) • More than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. **(HDV = goods vehicles + buses >3.5t gross vehicle weight).**	A Change of HDV flows of: • More than 25 AADT within or adjacent to an AQMA • More than 100 AADT elsewhere.
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. Traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: • More than 25 AADT within or adjacent to an AQMA • More than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. **NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.**	Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing NO_2 concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

Impact Descriptors for Individual Receptors

The IAQM guidance contains a two Stage process for determining the likely significant effects of the impacts on air quality:

- A qualitative or quantitative description of the impacts on local air quality arising from the development; and
- A judgement on the overall significance of the effects of any impacts.

A framework for describing the impacts is set out in IAQM guidance and summarised in Table D3 below.

Table D3 Indicative Criteria for Requiring an Air Quality Assessment

Long-term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (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

For air quality impacts arising from surrounding sources on new occupants of a development, then the impacts are best described in relation to whether an air quality objective will not be met or is at risk of not being met. Where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provisions is made to reduce their exposure by some means.

Changes of less than 0.5%, will be described as Negligible.

Appendix E Raw Traffic Data

Figure E1 2019 Traffic Count Points

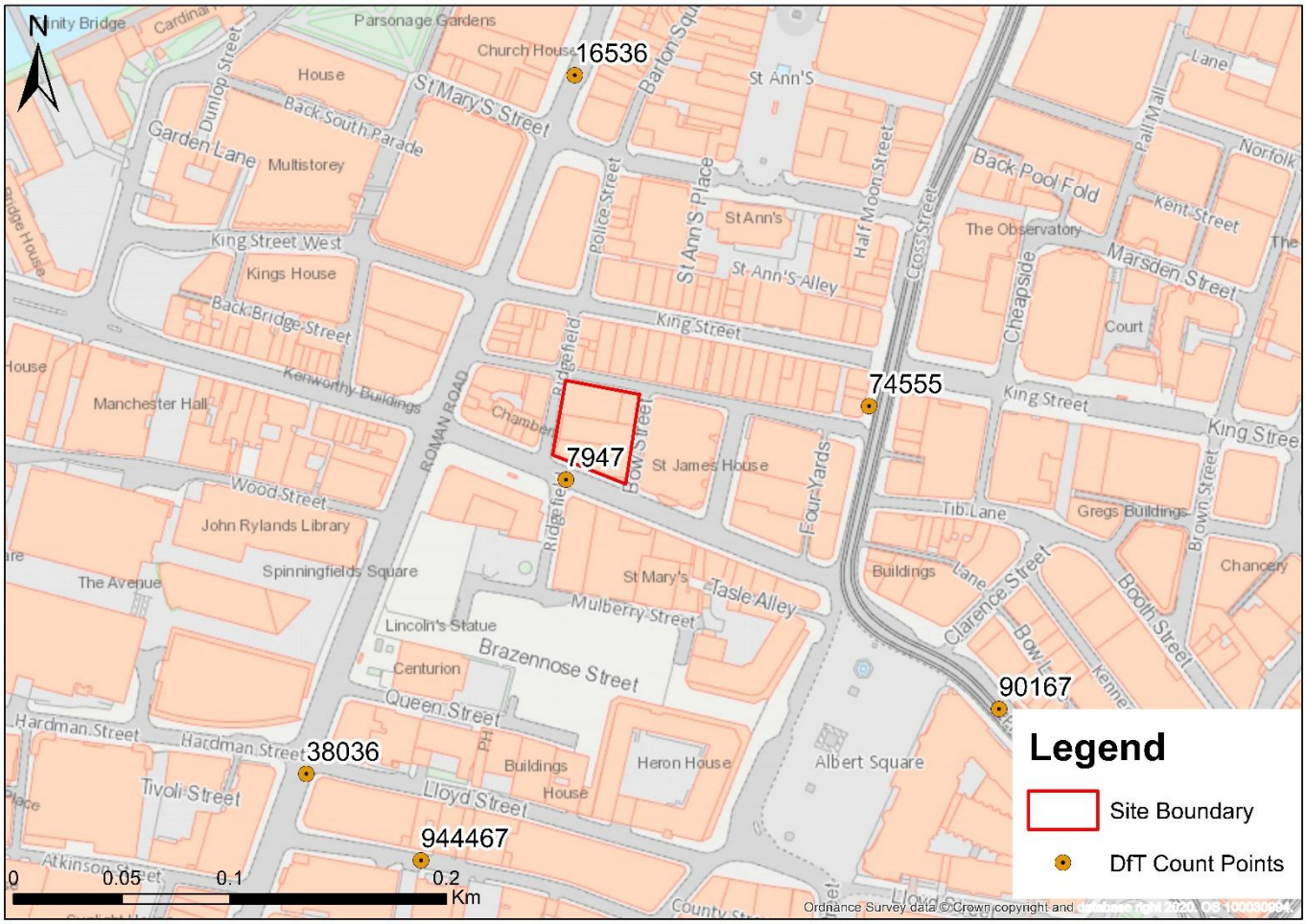

Table E1 Historic Traffic Data

Census Point	Road	2019 AADT	2019 HGV%
7947	A34	8,663	1.0
16536	A56	6,615	1.7
38036	A56	9,883	1.8
74555	A6042	3,374	2.3
90167	A34	2,361	1.4
944467	Unclassified – Jackson Row	621	2.1

Appendix F Proposed Generator Specification and PC Screening Calculation

Proposed Generator Specification

The details of proposed backup generator specification are presented in Table F1.

Table F1 Generator Specifications

Input Required	Units	Boiler Parameters
Thermal input	g/s	200kW per unit (250Kva standby rated)
Number of units	-	2*
Rate of emission of NO_x	g/s	0.333 g/s per unit**
Total annual hours	hours	26 per unit (0.5 hour weekly testing)
Stack height above ground	m	Effective height assumed 0m as worst case

** one for the office space, to be located at roof level (36m), and space allocation for one for ground floor/basement tenant, with flue to be located a high-level ground floor on eastern façade*
*** based on Dieselnet Stage II standards for Cat E (130 to 560kW) of 6.0g/kWh[46], in absence on any emission details for proposed generator. This is before any exhaust after treatment.*

Process Contribution Screening Calculation

Plant emissions were calculated using the methodology from the Department for Environment, Food & Rural Affairs (Defra) and Environment Agency (EA)'s air emission risk assessment[47]. The environmental concentration of NO_x released into the air is known as the process contribution (PC).

The short-term and long-term PCs to air were calculated following the EA's risk assessment methodology. PC to air is measured in micrograms per cubic meter, µg/m^3. To calculate the PC to air, the dispersion factors, in micrograms per cubic metre per gram per second, are multiplied by the release rate, in grams per second.

Emissions of oxides of nitrogen (NO_x) should be recorded as nitrogen dioxide (NO_2) in the assessment:

- For short-term PC, assume only 50% of emissions of NO_x convert to NO_2 in the environment;
- For long-term PC, assume all NO_x converts toNO_2.

The effective height of release was treated as 0 metres as a worst case, assuming the emission would be released at a point that is less than 3 metres above the ground or building on which the flues are located. The dispersion factors for effective height of release at 0m are presented in Table F2.

Table F2 Dispersion Factor

Effective height of release in meter	Annual Dispersion Factor	Hourly Dispersion Factor
0 m	148	3900
30m	1.7	77

[46] Dieselnet, Emission Standards, EU: Nonroad Engines, https://dieselnet.com/standards/eu/nonroad.php#s3
[47] Defra / Environment Agency, Air emissions risk assessment for your environmental permit https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#calculate-pc-to-air

The release rate was calculated by multiplying the gas flow (m^3/s) by the substance concentrations (mg/m^3) divided by 1,000. The estimations of PC at 0m, as a worst case and 30m (closest to roof height 36m where flue will be located). are presented in Table F3.

Table F3: PC Screening Calculation results

Averaging period	Max NO_2 PC ($\mu g/m^3$)	% AQO	Criteria	PC to air
0m				
LT	0.29	0.7	>1% of AQO	Below criteria
ST	3.86	1.9	>10% AQO	Below criteria
30m				
LT	<0.01	<0.1	>1% of AQO	Below criteria
ST	0.1	<0.1	>10% AQO	Below criteria

The EA spreadsheet-based results show that the maximum PC for NO_2 is likely to well below the long-term and short-term criteria at both 0m and 30m flue heights. As the flue are to be located at roof level (36m), the impact of the generators is predicted to be well below the criteria. Therefore, no further assessment of the generator emissions is required.

Appendix G Results of Screening Assessment

Table G1 Indicative Criteria for Requiring a Detailed Air Quality Assessment

Where the Development will:	Indicative Criteria to Proceed to an Air Quality Assessment	Information Relevant to the Proposed Development
1. Cause a significant change in Light Duty Vehicle (LDV) traffic slows on local roads with relevant receptors.	IAQM Guidance states a change of LDV flows of: • More than 100 AADT within or adjacent to an Air Quality Management Area (AQMA) • More than 500 AADT elsewhere.	The development does not include car parking. An assessment of increased transport emissions (dispersion modelling) was scoped out.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A Change of HDV flows of: • More than 25 AADT within or adjacent to an AQMA • More than 100 AADT elsewhere.	HDV flows are likely to be limited to delivery vehicles. HDV flows are anticipated to be below 25 AADT
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA	No realignment of >5m proposed
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. Traffic lights, or roundabouts.	No new junctions proposed
5. Introduce or change a bus station.	Where bus flows will change by: • More than 25 AADT within or adjacent to an AQMA • More than 100 AADT elsewhere.	No bus station proposed
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	No underground car parking proposed
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.	Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion.	Energy for the building is to be sourced from electricity. There will be a total of two emergency backup diesel generator. Anticipated use is expected to be 24 hours a year, associated with 30-minute weekly testing. The predicted process contribution (PC) for the generators are predicted to be well below the criteria for detailed assessment. Dispersion modelling has therefore not been carried out.

Appendix H Mitigation Measures for Construction

Primary measures are those that will be implemented at all times; Secondary measures will be implemented as necessary (in agreement with the local authority), while n/a measures are not required for a given level of risk.

Table H1 Construction Mitigation Measures- Site Management

Site Management	Low Risk	Medium Risk	High Risk
1. Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.	Primary		
2. Display the head or regional office contact information.	Primary		
3. Record and respond to all dust and air quality pollutant emissions complaints.	Primary		
4. Make a complaint log available to the local authority.	Primary		
5. Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority.	Primary		
6. Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry, or windy conditions.	Primary		
7. Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.	Primary		
8. Develop and implement a **stakeholder communications plan** that includes community engagement before work commences on-site.	n/a	Primary	
9. Develop a **dust management plan**.	n/a	Primary	
10. Hold regular liaison meetings with other high-risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.	n/a		Primary

Table H2 Construction Mitigation Measures- Preparing and Maintaining the Site

Preparing and Maintaining the Site	Low Risk	Medium Risk	High Risk
11. Plan site layout: machinery and dust causing activities will be located away from receptors.	Primary		
12. Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on-site.	Primary		
13. Avoid site runoff of water or mud.	Primary		
14. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	Secondary	Primary	
15. Keep site fencing, barriers, and scaffolding clean using wet methods.	Secondary	Primary	
16. Remove materials from site as soon as possible.	Secondary	Primary	
17. Cover, seed, or fence stockpiles to prevent wind whipping.	Secondary	Primary	
18. Agree monitoring locations with the local authority.	n/a	Primary	
19. Where possible, commence baseline monitoring at least three months before phase begins.	n/a	Primary	
20. Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.	n/a	Primary	
21. Carry out regular dust soiling checks of buildings within 100 m of site boundary and, if necessary, cleaning to be provided.	n/a	Secondary	Primary
22. Consider, if practical, installation of green walls, screens, or other green infrastructure to minimise the impact of dust and pollution.	n/a	Secondary	

Table H3 Construction Mitigation Measures- Operating Vehicle/Machinery and Sustainable Travel

Operating Vehicle/Machinery and Sustainable Travel	Low Risk	Medium Risk	High Risk
23. Ensure all non-road mobile machinery (NRMM) complies with relevant local standards.	Primary		
24. Ensure all vehicles switch off engines when stationary – no idling vehicles.	Primary		
25. Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment.	Primary		
26. Implement a **Travel Plan** that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	n/a	Secondary	Primary
27. Produce a **Construction Logistics Plan** to manage the sustainable delivery of goods and materials.	n/a	Primary	
28. Impose and signpost a maximum-speed-limit of 10 mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority).	Secondary		Primary

Table H4 Construction Mitigation Measures- Operations

Operations	Low Risk	Medium Risk	High Risk
29. 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.	Primary		
30. Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water).	Primary		
31. Use enclosed chutes, conveyors, and covered skips.	Primary		
32. Minimise drop heights from conveyors, loading shovels, hoppers, and other loading, or handling equipment, and use fine water sprays on such equipment.	Primary		
33. 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.	n/a	Primary	

Table H5 Construction Mitigation Measures- Waste Management Activities

Waste Management	Low Risk	Medium Risk	High Risk
34. Reuse and recycle waste to reduce dust from waste materials	Primary		
35. Avoid bonfires and burning of waste materials.	Primary		

Table H6 Construction Mitigation Measures- Demolition Activities

Measurement Specific to Demolition	Low Risk	Medium Risk	High Risk
36. Ensure water suppression is used during demolition operations.	Primary		
37. Avoid explosive blasting, using appropriate manual, or mechanical alternatives.	Primary		
38. Bag and remove any biological debris or damp down such material before demolition.	Primary		
39. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Secondary		Primary

Table H7 Construction Mitigation Measures- Earthworks Activities

Measurement Specific to Earthworks	Low Risk	Medium Risk	High Risk
40. Consider re-vegetating earthworks and exposed areas/soil stockpiles to stabilise surfaces.	n/a	Secondary	Primary
41. Consider the use of hessian, mulches, or trackifiers where it is not possible to re-vegetate or cover with topsoil.	n/a	Secondary	Primary
42. Only remove secure covers in small areas during work and not all at once.	n/a	Secondary	Primary

Table H8 Construction Mitigation Measures- Construction Activities

Measurement Specific to Construction	Low Risk	Medium Risk	High Risk
43. 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.	Secondary	Primary	
44. Avoid scabbling (roughening of concrete surfaces) if possible	Secondary		Primary
45. 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.	n/a	Secondary	Primary
46. For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	n/a	Secondary	

Table H9 Construction Mitigation Measures- Trackout Activities

Measures Specific To Trackout	Low Risk	Medium Risk	High Risk
47. Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site.	Secondary	Primary	
48. Avoid dry sweeping of large areas.	Secondary	Primary	
49. Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.	Secondary	Primary	
50. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site).	Secondary	Primary	
51. Record all inspections of haul routes and any subsequent action in a site log book.	Secondary	Primary	
52. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned.	n/a	Primary	
53. Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;	n/a	Primary	
54. 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.	n/a	Primary	
55. Access gates to be located at least 10 m from receptors where possible.	n/a	Primary	
56. Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.	n/a	Secondary	Primary

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