

Air Quality Assessment
Silk Street, Manchester

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Executive Summary

Redmore Environmental Ltd was commissioned by Faithful+Gould to undertake an Air Quality Assessment in support of a planning application for a residential development on land off Silk Street, Manchester.

The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future residents to elevated pollution levels. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential effects as a result of the scheme.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

Review of the dispersion modelling results indicated that predicted air quality impacts as a result of traffic generated by the development were not significant at any sensitive location in the vicinity of the site.

The results of the assessment also indicated that pollution levels were below the relevant criteria at all locations across the development. As such, the site is considered suitable for the proposed use from an air quality perspective.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Faithful+Gould to undertake an Air Quality Assessment in support of a planning application for a residential development on land off Silk Street, Manchester.

1.1.2 The proposed development has the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future residents to elevated pollution levels. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential effects associated with the scheme.

1.2 Site Location and Context

1.2.1 The site is located on land off Silk Street, Manchester, at approximate National Grid Reference (NGR): 388186, 400529. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise the erection of 74 modular homes comprising 20 terraced houses and 54 apartments.

1.2.3 The development has the potential to cause impacts at sensitive locations. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the site during the operational phase. Further to this, the proposals may introduce residents to any existing air quality issues at the site. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions, consider site suitability for the proposed end-use and consider potential effects as a result of the proposals. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 European Directives

2.1.1 European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new Air Quality Limit Values (AQLVs) for particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5}). The consolidated Directives include:

- Directive 1999/30/EC - the First Air Quality "Daughter" Directive - sets ambient AQLVs for nitrogen dioxide (NO₂), oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and,
- Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

2.1.2 The fourth daughter Directive was not included within the consolidation and is described as:

- Directive 2004/107/EC - sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

2.2 UK Legislation

2.2.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and transpose EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Air Quality Target Values (AQTVs) for an additional 5 pollutants.

2.2.2 Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for

Environment, Food and Rural Affairs (DEFRA) and published in July 2007¹. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.2.3 Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

2.2.4 Table 2 presents the AQTV considered within this assessment.

Table 2 Air Quality Target Values

Pollutant	Air Quality Target Values	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
PM _{2.5}	25	Annual mean

2.2.5 Table 3 summarises the advice provided in DEFRA guidance² on where the AQOs for pollutants considered within this report apply.

¹ The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

² Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Table 3 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.3 Local Air Quality Management

- 2.3.1 Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 3, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

- 2.4.1 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

- 2.4.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

2.5 National Planning Policy

- 2.5.1 The revised National Planning Policy Framework³ (NPPF) was published in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.
- 2.5.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

"c. An environmental objective - to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

³ NPPF, Ministry of Housing, Communities and Local Government, 2019.

2.5.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment 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 [...]"

2.5.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

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

2.5.5 The implications of the NPPF have been considered throughout this assessment.

2.6 National Planning Practice Guidance

2.6.1 The National Planning Practice Guidance⁴ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. Why should planning be concerned about air quality?
2. What is the role of Local Plans with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality be relevant to a planning decision?
6. Where to start if bringing forward a proposal where air quality could be a concern?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?
9. How do considerations about air quality fit into the development management process?

2.6.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.7 Local Planning Policy

2.7.1 The Manchester Local Development Framework consists of a series of planning documents of which the Core Strategy⁵ is central. This was adopted by Manchester City Council (MCC) on 11th July 2012 and provides policies which guide the determination of planning applications within the city.

2.7.2 A review of the Core Strategy identified Policy EN 16 Air Quality which is relevant to this assessment. The policy states:

"The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic

⁴ <http://planningguidance.planningportal.gov.uk>.

⁵ Core Strategy, MCC, 2012.

routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local effect of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new development the Council will consider the effects on air quality, alongside other plan objectives. This includes cumulative effects, particularly in Air Quality Management Areas."

- 2.7.3 This policy has been considered throughout this assessment by considering potential air quality effects as a result of the proposals.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases, as well as expose future residents to elevated pollution levels. These issues have been assessed in accordance with the following methodology.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'⁶.

3.2.2 Activities on the proposed construction site have been divided into three types to reflect their different potential impacts. These are:

- Earthworks;
- Construction; and,
- Trackout.

3.2.3 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

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

3.2.4 The assessment steps are detailed below.

⁶ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Step 1

- 3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 500m from the site entrance, then the assessment also proceeds to Step 2.
- 3.2.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2

- 3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:
- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
 - The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).
- 3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.
- 3.2.9 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 4.

Table 4 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
High	Earthworks	• Total site area greater than 10,000m² • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved

Magnitude	Activity	Criteria
	Construction	- Total building volume greater than 100,000m³ - On site concrete batching - Sandblasting
	Trackout	- More than 50 Heavy Duty Vehicle (HDV) trips per day - Potentially dusty surface material (e.g. high clay content) - Unpaved road length greater than 100m
Medium	Earthworks	- Total site area 2,500m² to 10,000m² - Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time - Formation of bunds 4m to 8m in height - Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	- Total building volume 25,000m³ to 100,000m³ - Potentially dusty construction material (e.g. concrete) - On site concrete batching
	Trackout	10 to 50 HDV trips per day - Moderately dusty surface material (e.g. high clay content) - Unpaved road length 50m to 100m
Small	Earthworks	- Total site area less than 2,500m² - Soil type with large grain size (e.g. sand) - Less than 5 heavy earth moving vehicles active at any one time - Formation of bunds less than 4m in height - Total material moved less than 20,000 tonnes - Earthworks during wetter months
	Construction	- Total building volume less than 25,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	- Less than 10 HDV trips per day - Surface material with low potential for dust release - Unpaved road length less than 50m

3.2.13 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 5.

Table 5 Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM₁₀. e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	• Nationally designated site e.g. Sites of Special Scientific Interest
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, shopping streets, playing fields, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.14 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;

- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

3.2.15 These factors were considered in the undertaking of this assessment.

3.2.16 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 6.

Table 6 Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

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

3.2.17 Table 7 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 7 Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low	Low

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Medium	Greater than 32µg/m ³	High	Medium	Low	Low	Low
			1 - 10	Medium	Low	Low	Low
		More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	28 - 32µg/m ³	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Low	-	1 or more	Low	Low	Low	Low

3.2.18 Table 8 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 8 Construction Dust - Sensitivity of the Area to Ecological Impacts

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

3.2.19 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts. Table 9 outlines the risk from earthworks and construction activities.

Table 9 Construction Dust - Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

3.2.20 Table 10 outlines the risk category from trackout activities.

Table 10 Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

3.2.21 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance⁷ to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

3.2.22 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

3.2.23 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The IAQM guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

3.3 Operational Phase Assessment

3.3.1 The development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site, as well as expose future residents to poor air quality. Potential impacts have been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2017 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2020 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2020 should the proposals be completed).

⁷ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

3.3.2 Reference should be made to Appendix 1 for assessment input data and details of the verification process.

Potential Development Impacts

3.3.3 Locations sensitive to potential changes in pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)⁸ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance⁹ on where the AQOs and AQTV apply, as summarised in Table 3, was utilised to determine appropriate receptor positions.

3.3.4 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'¹⁰. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in Table 11.

Table 11 Significance of Impact

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Proportion of AQO/AQTV (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO/AQTV	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO/AQTV	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO/AQTV	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO/AQTV	Moderate	Moderate	Substantial	Substantial
110% or more of AQO/AQTV	Moderate	Substantial	Substantial	Substantial

3.3.5 The matrix shown in Table 11 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell

⁸ DMRB Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

⁹ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

¹⁰ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document¹¹ provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and,
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

3.3.7 The IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

3.3.8 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. The IAQM guidance¹² suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

Future Exposure

3.3.9 The proposed development has the potential to expose future residents to poor air quality. Pollutant concentrations were therefore quantified across the site using dispersion modelling. The results were subsequently compared with the relevant AQOs and AQTV to determine the potential for any exceedence. Reference should be made to Appendix 1 for details of the relevant modelling inputs.

¹¹ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

¹² Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

4.0 BASELINE

4.1 Introduction

- 4.1.1 Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

- 4.2.1 As required by the Environment Act (1995), MCC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean NO₂ concentrations are above the AQO within the city. As such, a number of roads within Manchester have been included within the Greater Manchester Combined Authority (GMCA) AQMA. This is described as follows:

"This is the part of the Greater Manchester Combined Authority AQMA located within the Manchester City Council area."

- 4.2.2 The development is located approximately 30m south of the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

- 4.2.3 The site is located at the boundary of MCC and the neighbouring Oldham Metropolitan Borough Council (OMBC). OMBC have also undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO in the area surrounding a number of major roads. As such, part of Oldham has also been included within the GMCA AQMA. This is described as follows:

"This is the part of the Greater Manchester Combined Authority AQMA located within the Oldham Council area."

- 4.2.4 The AQMA is positioned approximately 300m north-east of the development. This has also been considered throughout the assessment.

- 4.2.5 MCC and OMBC have concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMA have been designated.

4.3 Air Quality Monitoring

- 4.3.1 Monitoring of pollutant concentrations is undertaken by MCC and OMBC throughout their areas of jurisdiction. Recent NO₂ results recorded in the vicinity of the development are shown in Table 12. Exceedences of the annual mean AQO are shown in **bold**.

Table 12 Monitoring Results

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)		
		2015	2016	2017
OL10	Mellor Street	33.1	28.4	-(a)
14	Clayton Day Nursery	21.91	23.27	22.35
23	Oldham Road	30.81	-(a)	-(a)
36	Rochdale Road	32.75	40.11	34.41

NOTE: (a) Data not available

- 4.3.2 As shown in Table 12, annual mean NO₂ concentrations were above the AQO at the 36 - Rochdale Road monitoring location in 2016. As this site is positioned at a roadside location adjacent to an AQMA, exceedences would be expected. NO₂ concentrations were below the AQO at the remaining locations. Reference should be made to Figure 2 for a map of the survey positions.
- 4.3.3 MCC and OMBC do not undertake PM₁₀ or PM_{2.5} monitoring within the vicinity of the site.

4.4 Background Pollutant Concentrations

- 4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR:

388500, 400500. Data for this location was downloaded from the DEFRA website¹³ for the purpose of the assessment and is summarised in Table 13.

Table 13 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2017	2019	2020
NO ₂	19.85	17.77	16.68
PM ₁₀	13.14	12.94	12.84
PM _{2.5}	8.45	8.24	8.14

4.4.2 As shown in Table 13, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and AQTV at the development site.

4.5 Sensitive Receptors

4.5.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Construction Phase Sensitive Receptors

4.5.2 Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 14.

Table 14 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	0
Up to 50	More than 100	0
Up to 100	More than 100	-

¹³ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015>.

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 350	More than 100	-

- 4.5.3 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 15.

Table 15 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	0
Up to 50	More than 100	0

- 4.5.4 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 16.

Table 16 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study did not indicate any dust generating activities in the local area

Guidance	Comment
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal indicated the following applications have recently been granted in the vicinity of the site: • Planning reference: 120247/FO/2018 - Erection of a single storey modular building with playground to form additional classroom, approximately 10m south of the development; • Planning reference: 095431/REP/2011/N1 - Erection of a part 10, part 6, part 5 storey building behind retained façade of the Rosedale building to form 114 one, two and three bedroom flats and Class A1 floorspace at ground floor level; and, • Planning reference: 122536/FH/2019 - Erection of two storey side extension to form additional living accommodation. It is therefore possible that there will be concurrent dust generation in the vicinity of the site should the construction phases of the above scheme and the proposals overlap
Pre-existing screening between the source and the receptors	There is no significant screening around the site boundary
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the south. As such, receptors to the north of the boundary are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.5.5 Based on the criteria shown in Table 5, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties. As such, users would expect to enjoy a reasonable level of amenity, aesthetics or value of their property could be diminished by soiling and people would be expected to be present for extended periods of time.

4.5.6 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 17.

Table 17 Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Low	Low	Low

Operational Phase Sensitive Receptors

4.5.7 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 18. Receptor heights were included in order to take account of less sensitive land uses at ground floor level, such as retail.

Table 18 Sensitive Receptor Locations

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Oldham Road	387859.6	400682.8	1.5
R2	Residential - Oldham Road	387963.7	400700.2	1.5
R3	Residential - Old Church Street	388060.9	400521.0	4.0
R4	Residential - Silk Street	388102.2	400525.6	4.0
R5	Residential - Old Church Street	388123.4	400497.7	4.0
R6	Residential - Culcheth Lane	388282.4	400350.6	1.5
R7	Residential - Droylsden Road	388430.3	400370.4	1.5
R8	Educational Facility - Great Newton Street	388243.7	400517.0	1.5
R9	Residential - Droylsden Road	388269.8	400548.0	1.5
R10	Residential - Droylsden Road	388245.9	400591.5	1.5
R11	Residential - Oldham Road	388187.9	400752.3	1.5
R12	Residential - Oldham Road	388369.1	400795.3	1.5

4.5.8 The sensitive receptors identified in Table 18 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that

may experience air quality impacts as a result of the proposals that have not been individually identified above. Reference should be made to Figure 4 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

5.0 **ASSESSMENT**

5.1 **Introduction**

- 5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the proposed development. These are assessed in the following Sections.

5.2 **Construction Phase Assessment**

Step 1

- 5.2.1 The undertaking of activities such as excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.
- 5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.
- 5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Earthworks

- 5.2.4 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site covers an area between 2,500m² and 10,000m². In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from earthworks is therefore **medium**.

5.2.5 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for dust soiling as a result of earthworks.

5.2.6 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

Construction

5.2.7 Due to the size of the development the total building volume is likely to be less than 25,000m³. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from construction is therefore **small**.

5.2.8 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for dust soiling as a result of construction activities.

5.2.9 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health impacts as a result of construction activities.

Trackout

5.2.10 Based on the site area and existing hardstanding provisions, it is anticipated that the unpaved road length is likely to be less than 50m. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from trackout is therefore **small**.

5.2.11 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 10, the development is considered to be a **low** risk site for dust soiling as a result of trackout activities.

5.2.12 Table 17 indicates the sensitivity of the area to human health impacts is **medium**. In accordance within the criteria outlined in Table 10, the development is considered to be a **negligible** risk site for human health impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

5.2.13 A summary of the risk from each dust generating activity is provided in Table 19.

Table 19 Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Medium	Low	Low
Human Health	Low	Negligible	Negligible

5.2.14 As indicated in Table 19, the potential risk of dust soiling is **medium** from earthworks and **low** from construction and trackout. The potential risk of human health impacts is **low** from earthworks and **negligible** from construction and trackout.

5.2.15 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

Step 3

5.2.16 The IAQM guidance¹⁴ provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 20. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the LA.

¹⁴ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Table 20 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken • Make the complaints log available to the LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	• Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site • Fully enclose specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • Keep site fencing, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used
Operating vehicle/machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable • Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials

Issue	Control Measure
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires and burning of waste materials
Earthworks	• Revegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
Construction	• Avoid scabbling (roughening of concrete surfaces) • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	• Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials • Implement a wheel washing system, if required

Step 4

5.2.17 Assuming the relevant mitigation measures outlined in Table 20 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁵.

5.3 Operational Phase Assessment

5.3.1 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site, as well as consider potential exposure of future residents to AQO and AQTV exceedences.

5.3.2 The assessment considered the following scenarios:

¹⁵ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

- 2017 - Verification;
- 2020 - DM; and,
- 2020 - DS.

5.3.3 The DM scenario (i.e. without development) included anticipated baseline traffic data, inclusive of anticipated growth for the relevant assessment year. The DS scenario (i.e. with development) included anticipated baseline traffic data, inclusive of anticipated growth for the relevant assessment year, in addition to predicted vehicle trips associated with the operation of the proposals.

5.3.4 Reference should be made to Appendix 1 for full assessment input details.

Potential Development Impacts

Predicted Concentrations

5.3.5 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 21. Exceedences of the AQO are shown in **bold**.

Table 21 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Oldham Road	44.01	44.05	0.04
R2	Residential - Oldham Road	46.39	46.40	0.01
R3	Residential - Old Church Street	25.75	25.77	0.02
R4	Residential - Silk Street	27.02	27.08	0.06
R5	Residential - Old Church Street	32.77	32.77	0.00
R6	Residential - Culcheth Lane	27.28	27.35	0.07
R7	Residential - Droylsden Road	32.20	32.24	0.04
R8	Educational Facility - Great Newton Street	29.62	29.67	0.05
R9	Residential - Droylsden Road	29.62	29.69	0.07

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R10	Residential - Droylsden Road	46.59	46.67	0.08
R11	Residential - Oldham Road	32.72	32.76	0.04
R12	Residential - Oldham Road	27.92	27.97	0.05

5.3.6 As indicated in Table 21, predicted annual mean NO₂ concentrations were below the relevant AQO at 9 receptors and above at three positions in both the DM and DS scenarios. It should be noted that there are no new predicted exceedences in the DS scenario when compared with the DM.

5.3.7 Reference should be made to Figures 5 and 6 for graphical representations of annual mean NO₂ concentrations across the assessment area for the DM and DS scenarios, respectively.

5.3.8 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Table 22 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Oldham Road	16.96	16.96	0.01
R2	Residential - Oldham Road	17.76	17.76	0.00
R3	Residential - Old Church Street	14.33	14.33	0.00
R4	Residential - Silk Street	14.52	14.53	0.01
R5	Residential - Old Church Street	15.41	15.41	0.00
R6	Residential - Culcheth Lane	14.56	14.57	0.01
R7	Residential - Droylsden Road	15.34	15.35	0.01
R8	Educational Facility - Great Newton Street	14.93	14.94	0.01
R9	Residential - Droylsden Road	14.93	14.94	0.01

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R10	Residential - Droylsden Road	17.42	17.43	0.01
R11	Residential - Oldham Road	15.48	15.48	0.01
R12	Residential - Oldham Road	14.66	14.67	0.01

5.3.9 As indicated in Table 22, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

5.3.10 Reference should be made to Figures 7 and 8 for graphical representations of annual mean PM₁₀ concentrations across the assessment area for the DM and DS scenarios, respectively.

5.3.11 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 23.

Table 23 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Oldham Road	10.72	10.72	0.00
R2	Residential - Oldham Road	11.17	11.17	0.00
R3	Residential - Old Church Street	9.14	9.14	0.00
R4	Residential - Silk Street	9.25	9.26	0.01
R5	Residential - Old Church Street	9.78	9.78	0.00
R6	Residential - Culcheth Lane	9.27	9.28	0.01
R7	Residential - Droylsden Road	9.74	9.74	0.00
R8	Educational Facility - Great Newton Street	9.49	9.50	0.00
R9	Residential - Droylsden Road	9.49	9.50	0.01
R10	Residential - Droylsden Road	10.99	11.00	0.01

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R11	Residential - Oldham Road	9.81	9.82	0.00
R12	Residential - Oldham Road	9.34	9.34	0.00

5.3.12 As indicated in Table 22, predicted annual mean PM_{2.5} concentrations were below the AQTV at all sensitive receptors in both scenarios.

5.3.13 Reference should be made to Figures 9 and 10 for graphical representations of annual mean PM_{2.5} concentrations across the assessment area for the DM and DS scenarios, respectively.

Predicted Impacts

5.3.14 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 24.

Table 24 Predicted Impacts - NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Oldham Road	110% or more of AQO	0	Negligible
R2	Residential - Oldham Road	110% or more of AQO	0	Negligible
R3	Residential - Old Church Street	Below 75% of AQO	0	Negligible
R4	Residential - Silk Street	Below 75% of AQO	0	Negligible
R5	Residential - Old Church Street	76 - 94% of AQO	0	Negligible
R6	Residential - Culcheth Lane	Below 75% of AQO	0	Negligible
R7	Residential - Droylsden Road	76 - 94% of AQO	0	Negligible
R8	Educational Facility - Great Newton Street	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R9	Residential - Droylsden Road	Below 75% of AQO	0	Negligible
R10	Residential - Droylsden Road	110% or more of AQO	0	Negligible
R11	Residential - Oldham Road	76 - 94% of AQO	0	Negligible
R12	Residential - Oldham Road	Below 75% of AQO	0	Negligible

5.3.15 As indicated in Table 24, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be **negligible** at all sensitive receptors.

5.3.16 Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 25.

Table 25 Predicted Impacts - PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Oldham Road	Below 75% of AQO	0	Negligible
R2	Residential - Oldham Road	Below 75% of AQO	0	Negligible
R3	Residential - Old Church Street	Below 75% of AQO	0	Negligible
R4	Residential - Silk Street	Below 75% of AQO	0	Negligible
R5	Residential - Old Church Street	Below 75% of AQO	0	Negligible
R6	Residential - Culcheth Lane	Below 75% of AQO	0	Negligible
R7	Residential - Droylsden Road	Below 75% of AQO	0	Negligible
R8	Educational Facility - Great Newton Street	Below 75% of AQO	0	Negligible
R9	Residential - Droylsden Road	Below 75% of AQO	0	Negligible
R10	Residential - Droylsden Road	Below 75% of AQO	0	Negligible
R11	Residential - Oldham Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R12	Residential - Oldham Road	Below 75% of AQO	0	Negligible

5.3.17 As indicated in Table 25, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

5.3.18 Predicted impacts on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 26.

Table 26 Predicted Impacts - PM_{2.5}

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of AQTV (%)	Impact Significance
R1	Residential - Oldham Road	Below 75% of AQTV	0	Negligible
R2	Residential - Oldham Road	Below 75% of AQTV	0	Negligible
R3	Residential - Old Church Street	Below 75% of AQTV	0	Negligible
R4	Residential - Silk Street	Below 75% of AQTV	0	Negligible
R5	Residential - Old Church Street	Below 75% of AQTV	0	Negligible
R6	Residential - Culcheth Lane	Below 75% of AQTV	0	Negligible
R7	Residential - Droylsden Road	Below 75% of AQTV	0	Negligible
R8	Educational Facility - Great Newton Street	Below 75% of AQTV	0	Negligible
R9	Residential - Droylsden Road	Below 75% of AQTV	0	Negligible
R10	Residential - Droylsden Road	Below 75% of AQTV	0	Negligible
R11	Residential - Oldham Road	Below 75% of AQTV	0	Negligible
R12	Residential - Oldham Road	Below 75% of AQTV	0	Negligible

5.3.19 As indicated in Table 26, impacts on annual mean PM_{2.5} concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

Potential Future Exposure

- 5.3.20 The proposed development has the potential to cause exposure of future residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions at the site. Reference should be made to Figures 6, 8 and 10 for graphical representations of the results.
- 5.3.21 As shown in Figure 6, Annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ at all locations across the development. The maximum level at the site boundary was 32.62µg/m³. As such, future residents are not predicted to be exposed to NO₂ concentrations above the AQO.
- 5.3.22 As shown in Figure 8, Annual mean PM₁₀ concentrations were predicted to be below the AQO of 40µg/m³ at all locations across the development. The maximum level at the site boundary was 15.40µg/m³. As such, future residents are not predicted to be exposed to PM₁₀ concentrations above the AQO.
- 5.3.23 As shown in Figure 11, Annual mean PM_{2.5} concentrations were predicted to be below the AQTV of 25µg/m³ at all locations across the development. The maximum level at the site boundary was 9.75µg/m³. As such, future residents are not predicted to be exposed to PM_{2.5} concentrations above the AQTV.
- 5.3.24 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the relevant AQOs and AQTV at any location within the development. As such, the site is considered suitable for the proposed end use from an air quality perspective.

Mitigation

- 5.3.25 There are a number of mitigation options available to reduce or off-set potential air quality impacts. However, all techniques have financial implications and may therefore affect scheme viability. As such, they should only be included if necessary. As air quality impacts associated with the proposals were predicted to be **negligible** and exposure of future residents to exceedences of the AQOs and AQTV was not predicted, further mitigation to control effects is not considered necessary. However, a number of additional measures have been included within the scheme in accordance with the

requirements of the IAQM document 'Land-Use Planning & Development Control:

Planning for Air Quality'¹⁶ to encourage the use of sustainable transport modes, manage vehicle flow and reduce pollution around the site. Table 27 describes the good practice principles detailed in the IAQM guidance along with how each has been addressed with regards to the proposals.

Table 27 Good Practice Design Principles

Phase	Principle	Action
Design Phase	New developments should not contravene the Council's Air Quality Action Plan ¹⁷ , or render any of the measures unworkable	It is confirmed that the proposals will not contravene MCC's Air Quality Action Plan, or render any of the measures unworkable
	Wherever possible, new developments should not create a new "street canyon", or a building configuration that inhibits effective pollution dispersion	The proposals will not lead to the generation of a street canyon
	Delivering sustainable development should be the key theme of any application	The proposals have been designed to encourage sustainable behaviours, such as active and public transport, due to its close proximity to local bus routes and amenities
	New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads, or directing combustion generated pollutants through or chimney stacks	The results of the dispersion modelling indicated that residents are not predicted to be exposed to exceedences of the relevant AQOs and AQTV with the development in place
Operational Phase	The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1,000m ² of commercial floor space. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made	The number of EV charging points to be provided by the site has not been finalised. However, it is recommended that 7 EV charging points are installed to represent one point per 10 residential dwellings

¹⁶ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

¹⁷ Greater Manchester Air Quality Action Plan (GMAQAP) 2016-2021, GMCA, 2016.

Phase	Principle	Action
	Where development generates significant additional traffic, provision of a detailed Travel Plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety	A full Travel Plan may be prepared in support of the development, should it be requested by MCC
	All gas-fired boilers to meet a minimum standard of <40mgNO_x/kWh. All gas-fired CHP plant to meet a minimum emissions standard of: • Spark ignition engine: 250mgNO_x/Nm³; • Compression ignition engine: 400mgNO_x/Nm³; • Gas turbine: 50mgNO_x/Nm³. A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of: • Solid biomass boiler: 275mgNO_x/Nm³ and 25mgPM/Nm³	Any boilers to be included in the development will be provisioned in accordance with the relevant requirements

5.3.26 It is considered the above methods would further reduce potential impacts associated with the proposals. Specific mitigation suited to the proposals may be stipulated as a planning condition if deemed necessary by the LA.

Overall Impact Significance

5.3.27 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impacts at discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 28.

Table 28 Overall Impact Significance

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO₂ concentrations were above the relevant AQO at three receptors and below at nine locations in the DM scenario Predicted annual mean PM₁₀ and PM_{2.5} concentrations were below the relevant AQO and AQTV at all sensitive locations in the DM scenario The predicted concentrations are considered unlikely to change significantly in the absence of the proposals given the established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs or AQTV
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	The assessment assumed that vehicle exhaust emission rates and background pollutant levels will not reduce in future years. This provides worst-case results when compared with DEFRA and Highways Agency methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

5.3.1 The IAQM guidance¹⁸ states that only if the impact is **moderate** or **substantial**, the effect is considered **significant**. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

¹⁸ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.0 CONCLUSION

- 6.1.1 Redmore Environmental Ltd was commissioned by Faithful+Gould to undertake an Air Quality Assessment in support of a planning application for a residential development on land off Silk Street, Manchester.
- 6.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future residents to any existing air quality issues. As such, an Air Quality Assessment was required in order to determine baseline conditions and assess potential effects as a result of the scheme.
- 6.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **not significant**.
- 6.1.4 The proposed development has the potential to expose future residents to elevated pollution levels and impact existing air quality in the vicinity of the site during operation. Dispersion modelling was therefore undertaken using ADMS-Roads in order to predict pollutant concentrations as a result of emissions from the local highway network. Results were subsequently verified using local monitoring data.
- 6.1.5 Review of the dispersion modelling results indicated that impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations as a result of traffic generated by the development were predicted to be **negligible** at all sensitive receptor locations.
- 6.1.6 The results of the dispersion modelling assessment indicated that NO₂, PM₁₀ and PM_{2.5} concentrations were predicted to be below the relevant AQOs and AQTV at all locations across the development. As such, the site is considered suitable for the proposed use from an air quality perspective.
- 6.1.7 Based on the worst case predicted impact, the overall significance of potential air quality impacts was determined as **negligible**. Following consideration of the relevant issues, air

quality impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.

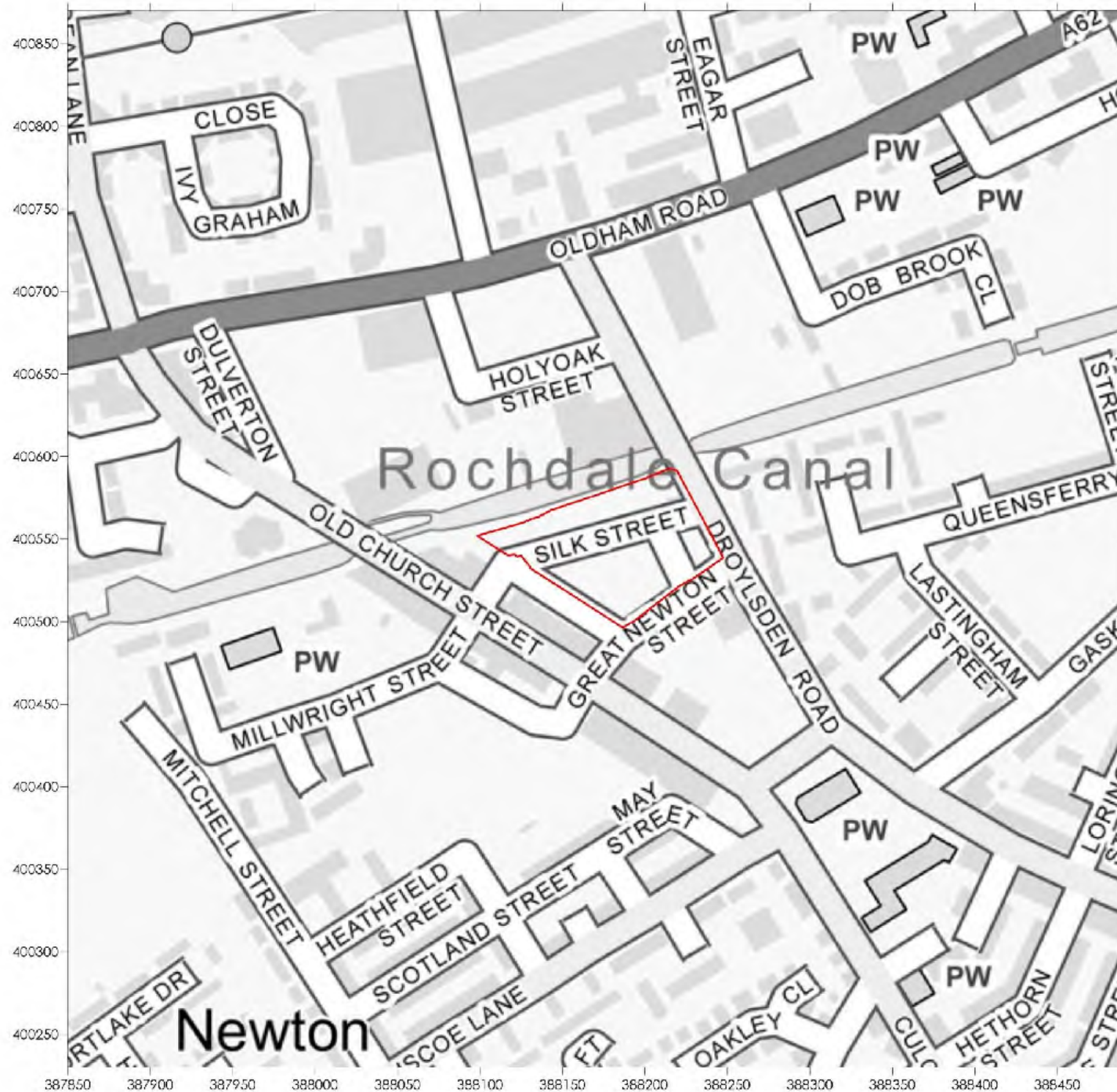
- 6.1.8 Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

7.0 **ABBREVIATIONS**

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
AQTV	Air Quality Target Value
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
EB	Eastbound
EU	European Union
EV	Electric Vehicle
GMCA	Greater Manchester Combined Authority
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
MCC	Manchester City Council
NB	Northbound
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
OMBC	Oldham Metropolitan Borough Council
PM _{2.5}	Particulate Matter with an aerodynamic diameter of less than 2.5µm
PM ₁₀	Particulate Matter with an aerodynamic diameter of less than 10µm
SB	Southbound

WB	Westbound
Z0	Roughness length

Figures



Legend



Title

Figure 1 - Site Location Plan

Project

Air Quality Assessment
Silk Street, Manchester

Project Reference

2723

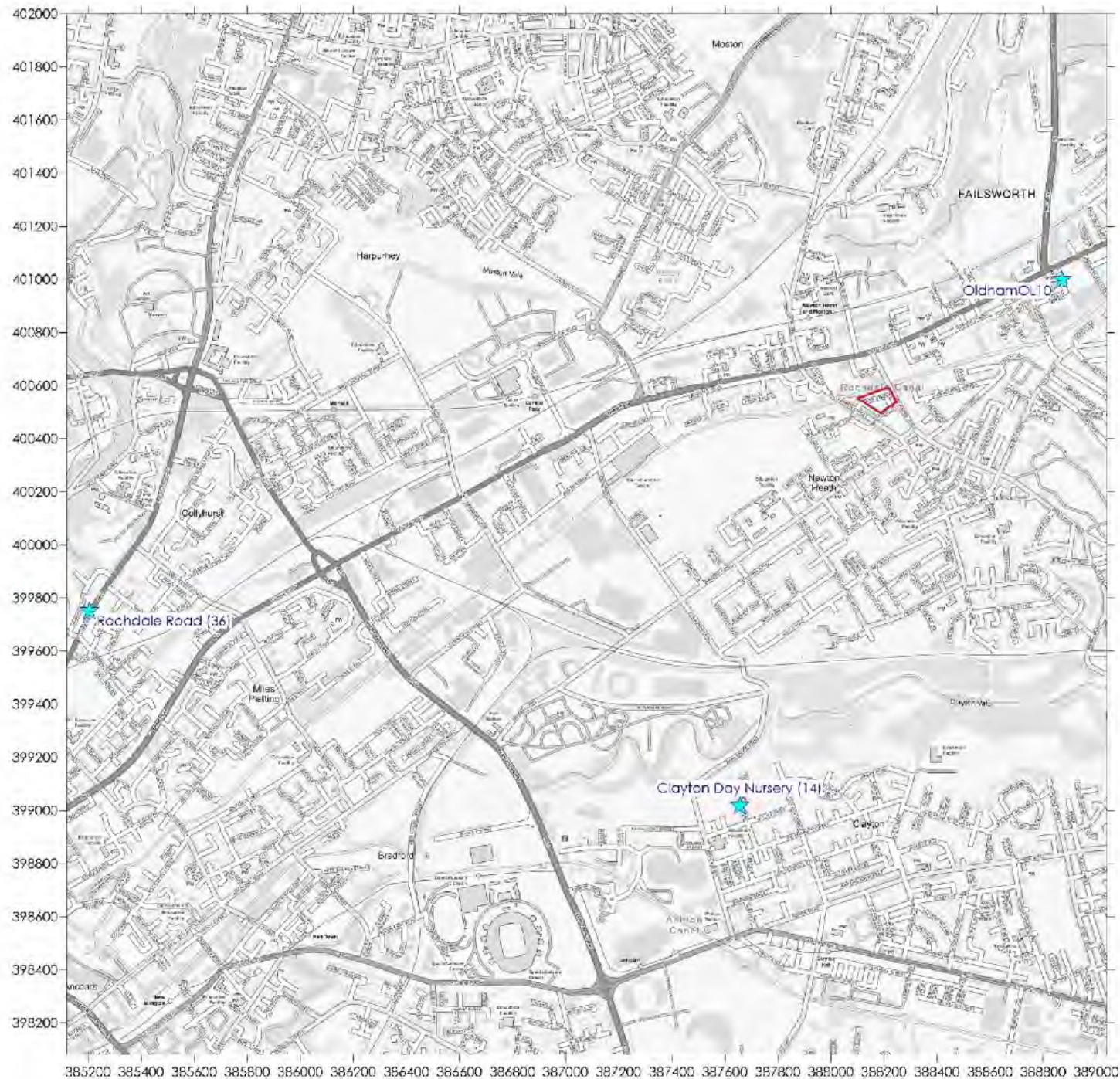
Client

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Legend

-  Site Boundary
-  Monitor

Title

Figure 2- Monitoring Locations

Project

Air Quality Assessment
Silk Street, Manchester

Project Reference

2723

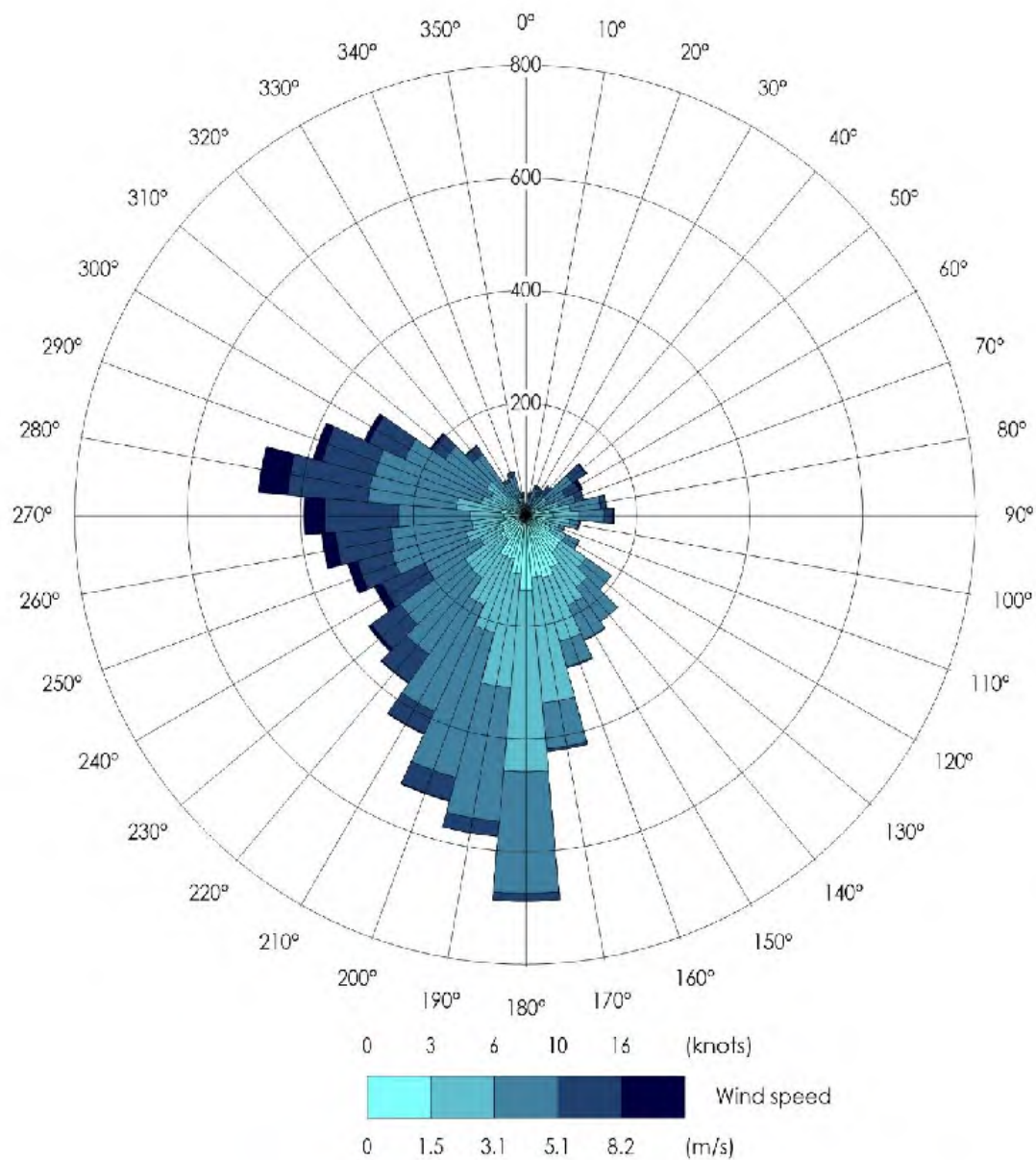
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Title

Figure 3 - Wind Rose of 2017
Manchester Airport Meteorological
Data

Project

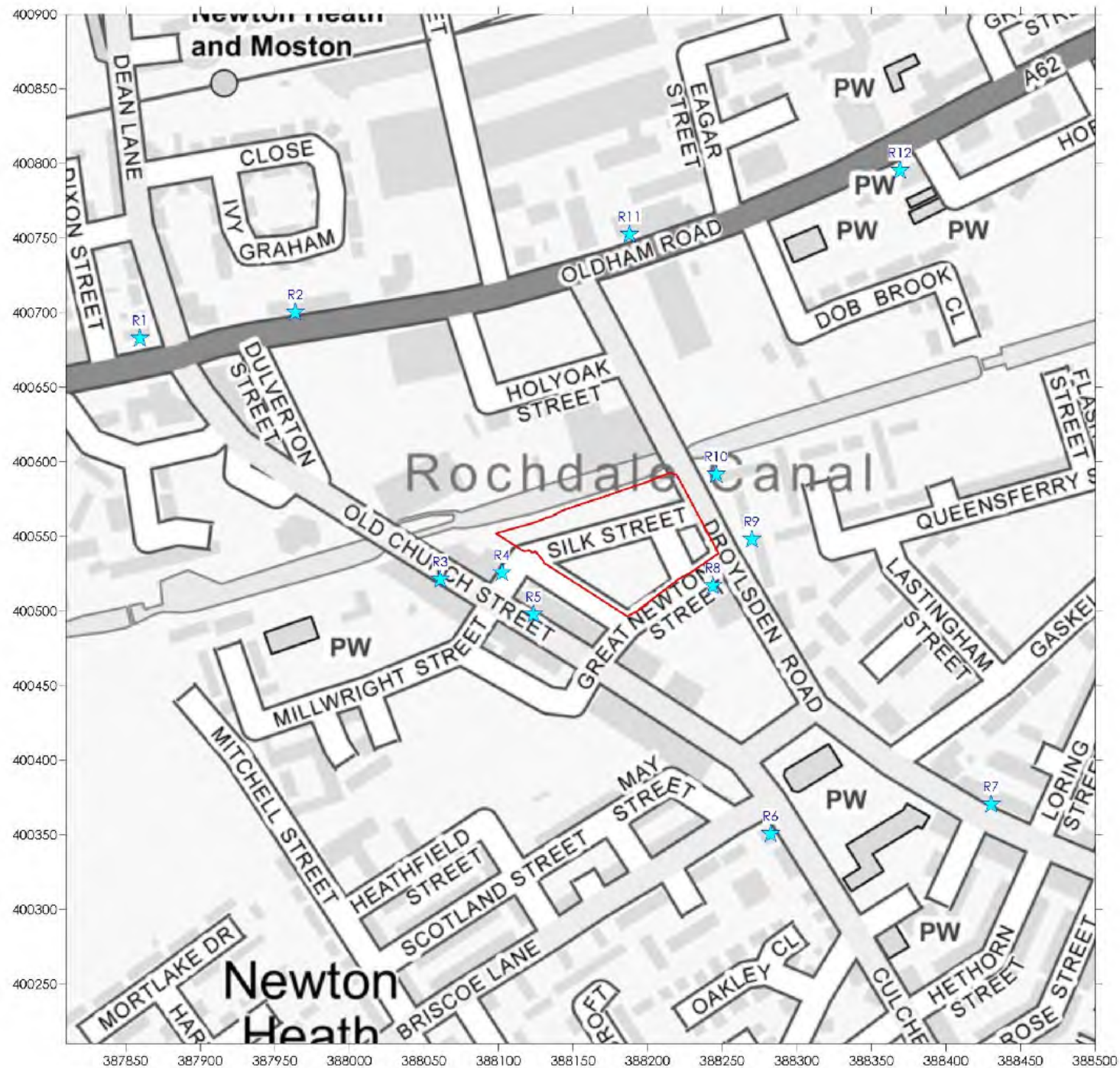
Air Quality Assessment
Silk Street, Manchester

Project Reference

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Legend

-  Site Boundary
-  Receptor

Title

Figure 4 - Road Vehicle Exhaust
Emissions Sensitive Receptor
Locations

Project

Air Quality Assessment
Silk Street, Manchester

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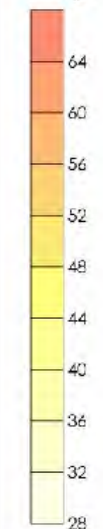




Legend



Site Boundary



Title

Figure 6 - Predicted Annual Mean NO₂ Concentrations (µg/m³)
Do-Something

Project

Air Quality Assessment
Silk Street, Manchester

Project Reference

2723

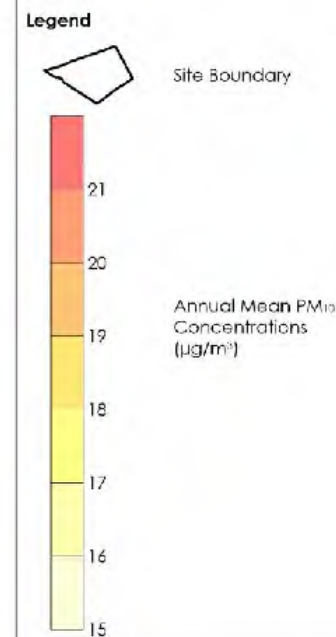
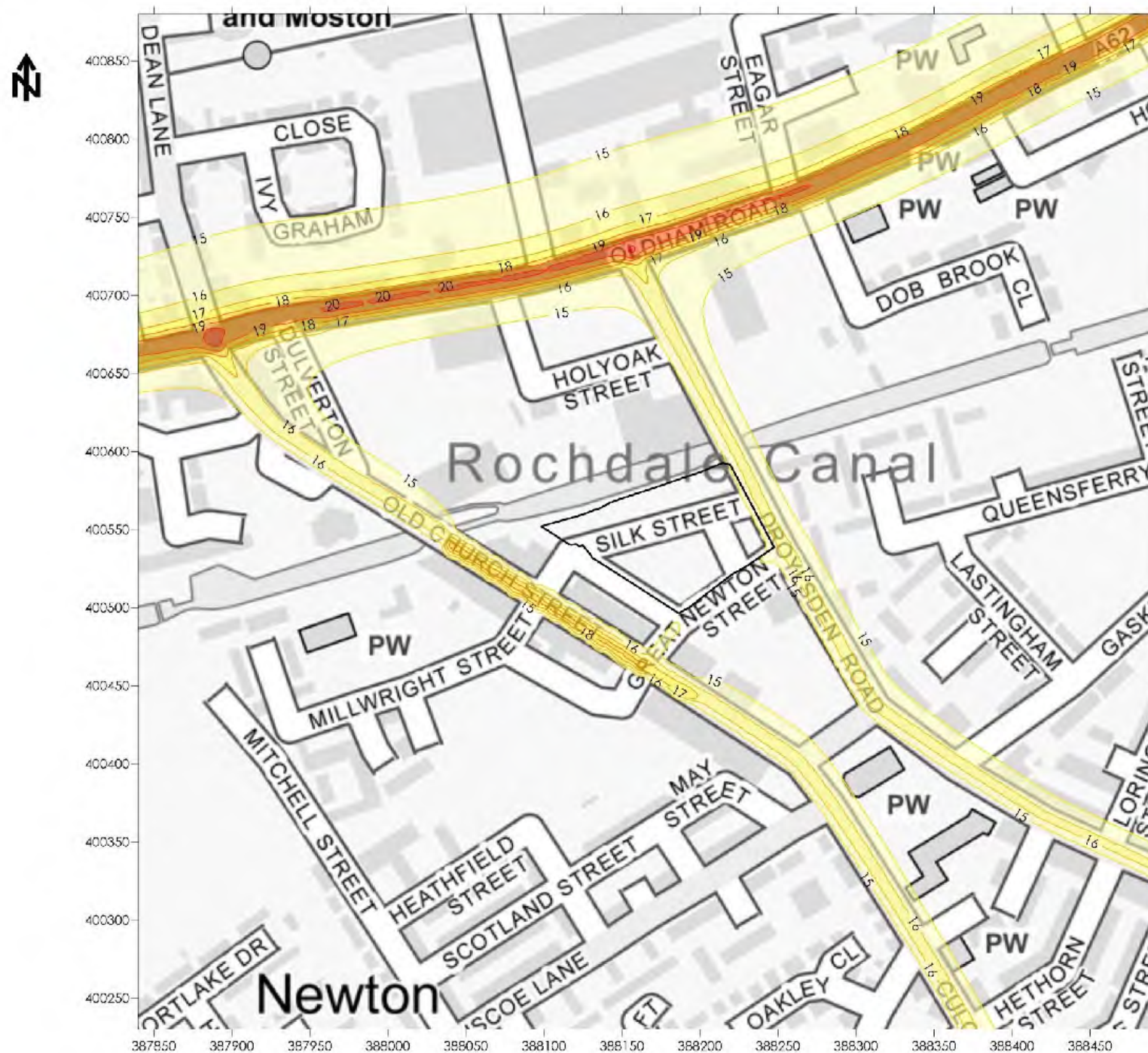
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Title
Figure 7 - Predicted Annual Mean PM₁₀ Concentrations (µg/m³) Do-Minimum

Project
Air Quality Assessment
Silk Street, Manchester

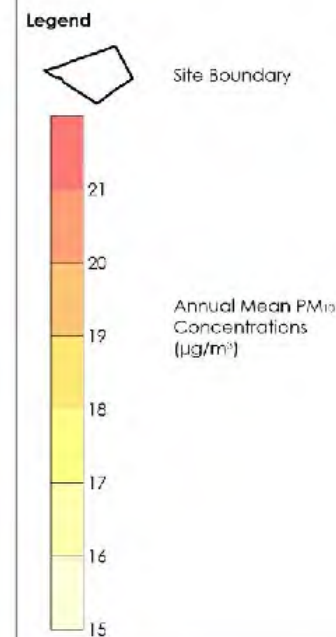
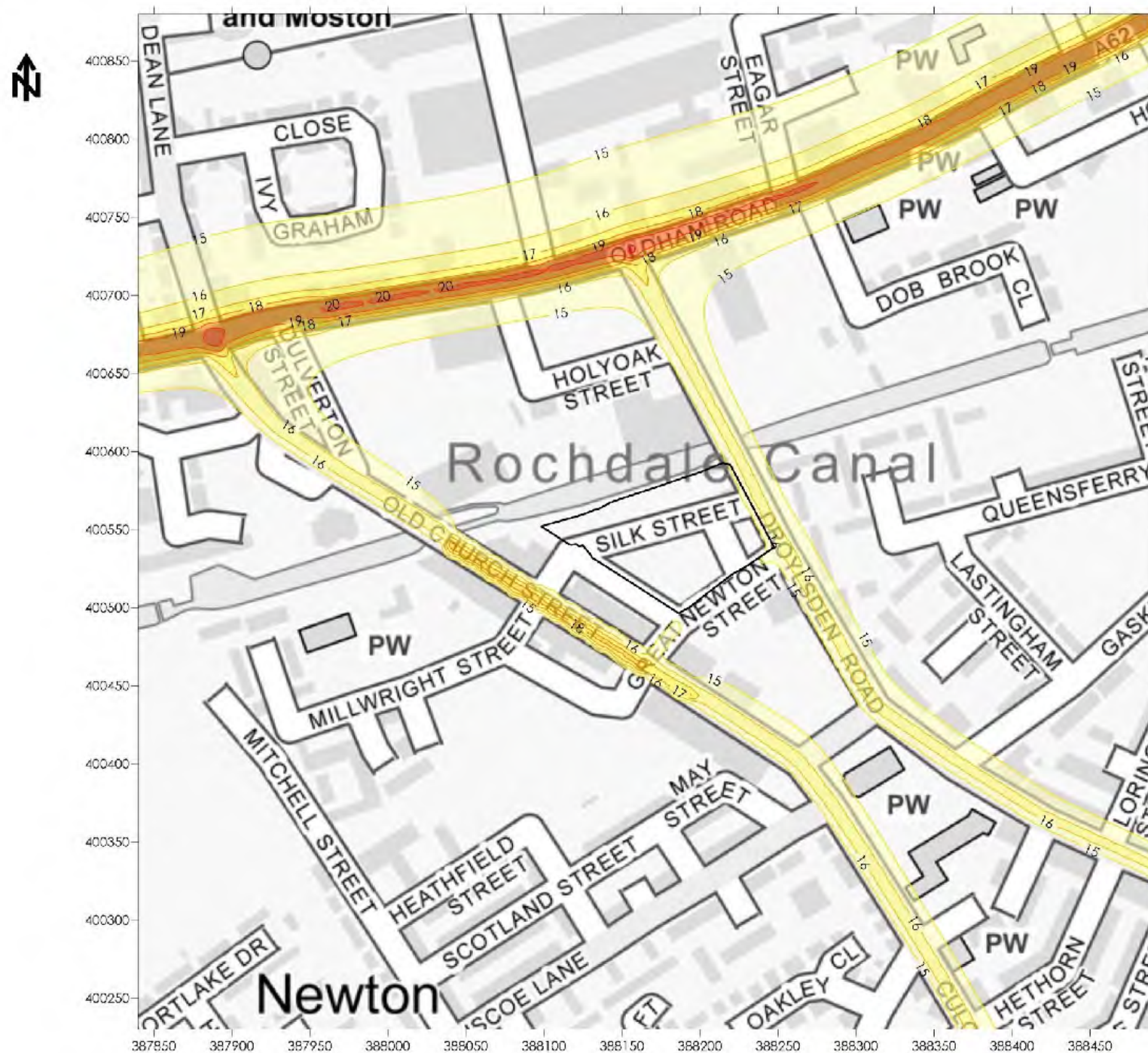
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Title
Figure 8 - Predicted Annual Mean PM₁₀ Concentrations (µg/m³)
Do-Something

Project
Air Quality Assessment
Silk Street, Manchester

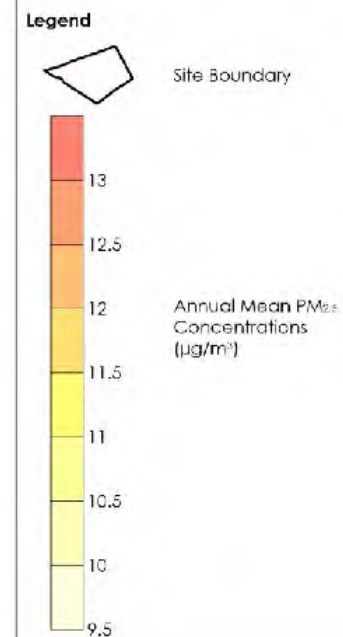
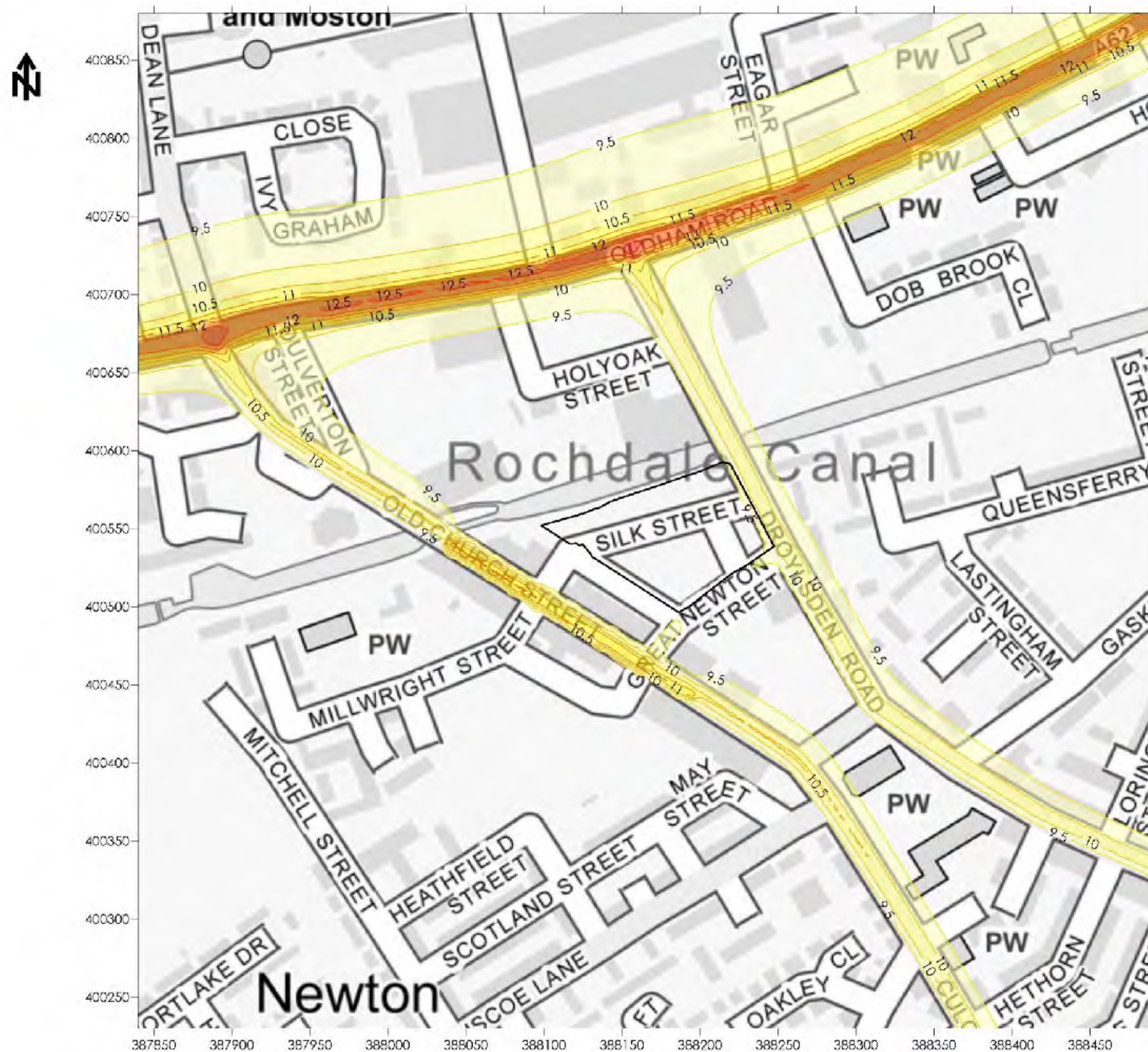
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Title
Figure 9 - Predicted Annual Mean PM_{2.5} Concentrations (µg/m³)
Do-Minimum

Project
Air Quality Assessment
Silk Street, Manchester

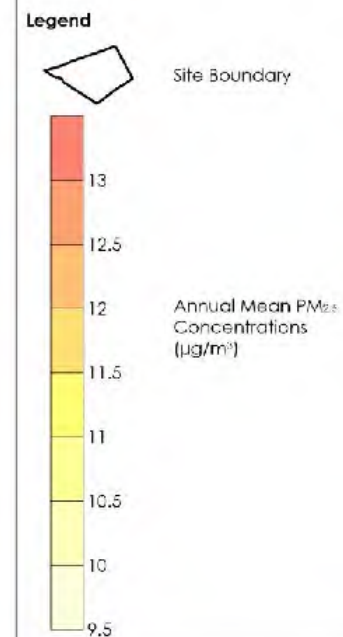
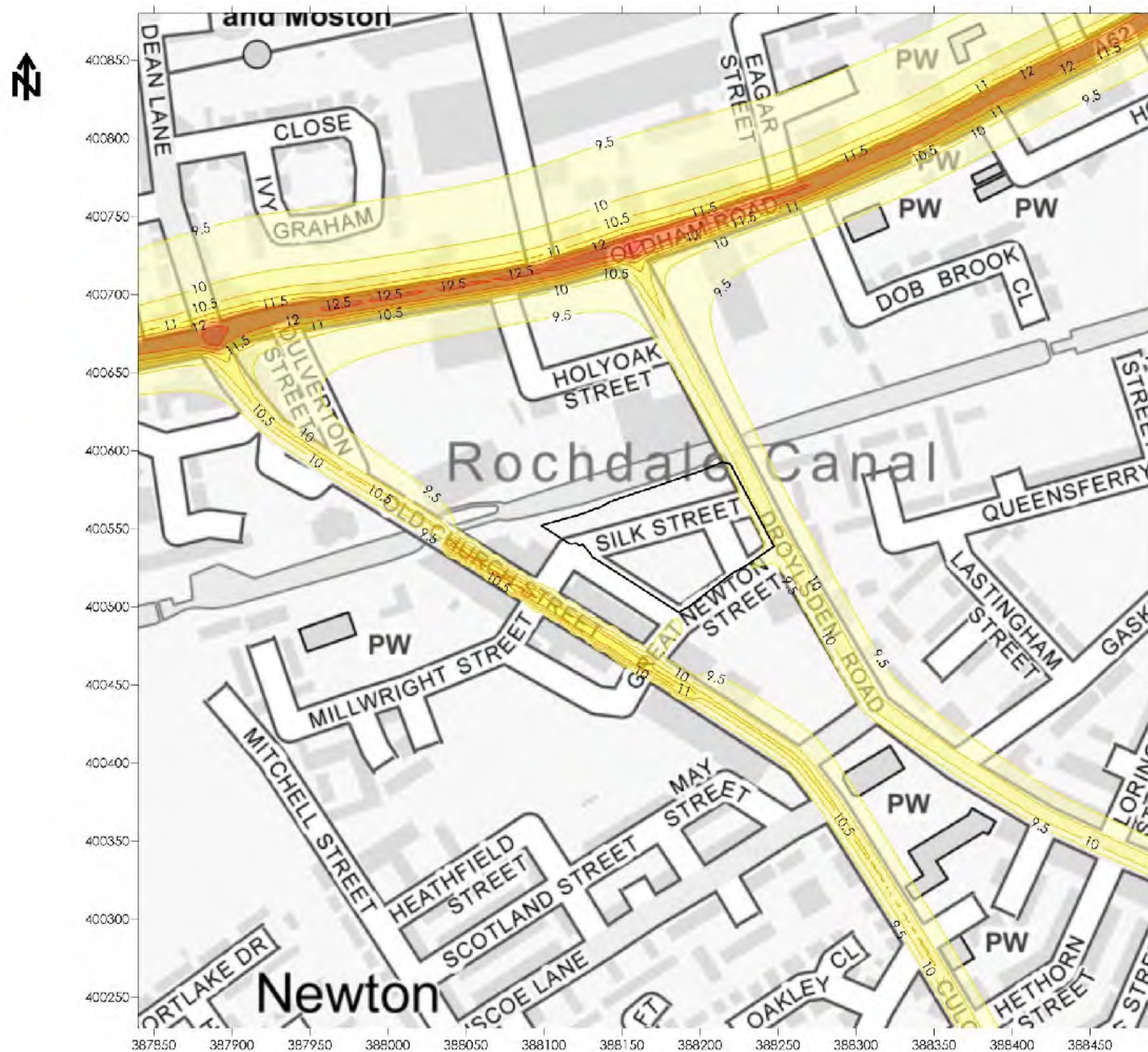
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Title
Figure 10 - Predicted Annual Mean PM_{2.5} Concentrations (µg/m³)
Do-Something

Project
Air Quality Assessment
Silk Street, Manchester

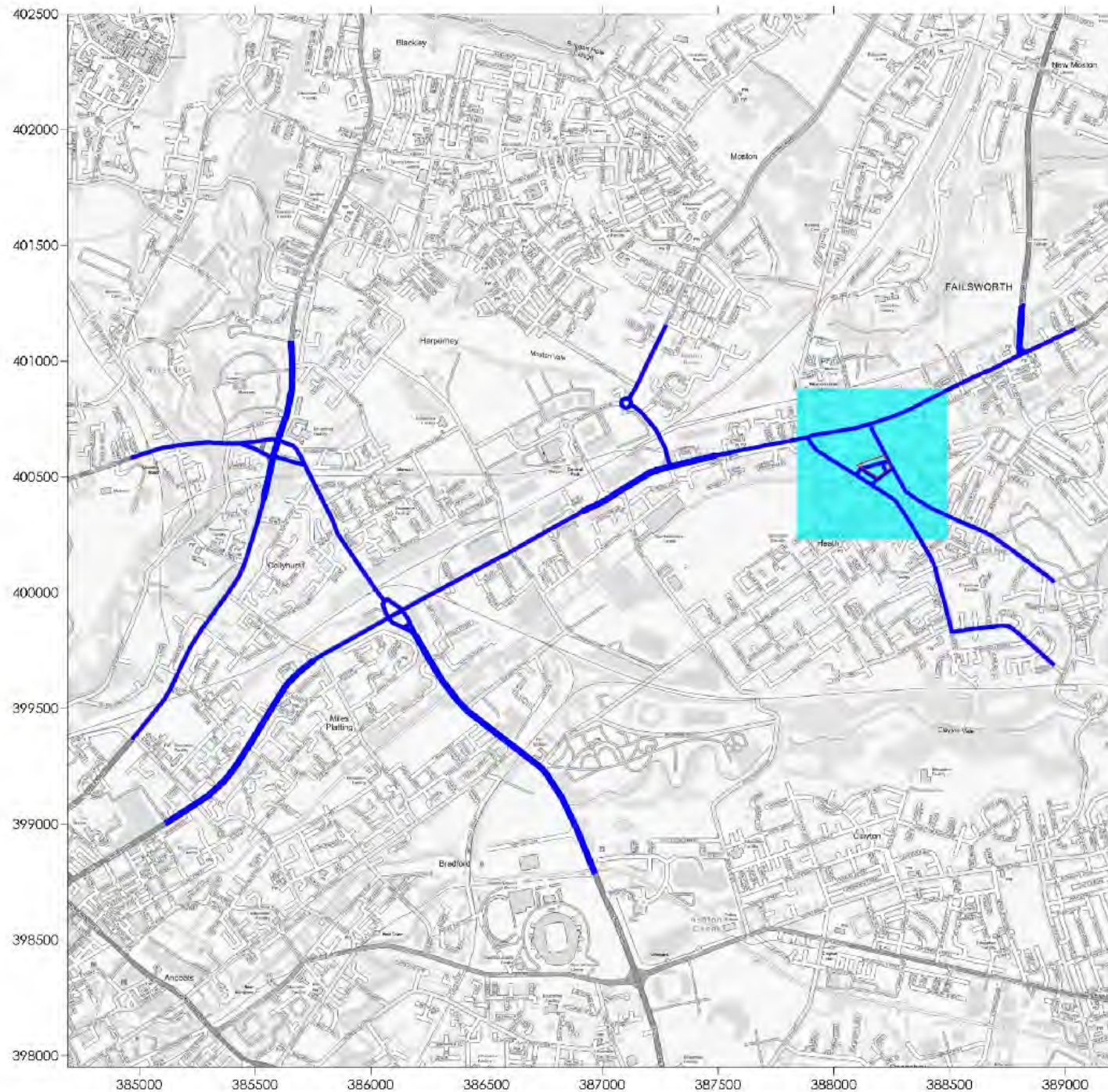
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Legend

-  Site Boundary
-  Road Link
-  Output Grid

Title

Figure 11 - ADMS-Roads Inputs

Project

Air Quality Assessment
Silk Street, Manchester

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Appendix 1 - Assessment Input Data

Introduction

The proposed development has the potential to cause air quality impacts as a result of vehicles travelling to and from the site, as well as expose future residents to elevated pollution levels. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.1.1.0). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

Additional options can also be selected within the ADMS-Roads interface to take account of site specific characteristics that may affect model output, such as canyons.

The following Sections detail the relevant inputs utilised in the assessment.

Assessment Area

Ambient concentrations were predicted over the area NGR: 387840, 400230 to 388490, 400880. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 11 for a graphical representation of the assessment grid extents.

Receptors potentially sensitive to changes in pollutant concentrations were included in the assessment as outlined in the main report text.

Traffic Flow Data

Baseline traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as HDV proportion, was provided by Curtins Consulting Limited, the Transport Consultants for the project.

Traffic data for several links within the model was not available from the Transport Consultants and was therefore supplemented with information from the Department for Transport (DfT)¹⁹. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 1999 to 2017. It should be noted that the DfT web tool is referenced in DEFRA guidance²⁰ as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

Baseline traffic data was converted to the site opening year utilising a factor obtained from TEMPro (version 7.2). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

Traffic generation associated with the proposals was provided by Curtins Consulting Limited. This was applied to the relevant road links to establish the DS scenario.

A summary of the traffic flows is provided in Table A1.1.

¹⁹ <http://www.dft.gov.uk/traffic-counts/>.

²⁰ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Table A1.1 Traffic Flows

Link		24-hour AADT Flow			HDV Proportion (%)		
		Verif.	2020 DM	2020 DS	Verif.	2020 DM	2020 DS
L1	A62, Oldham Road, West of Old Church Street	27,544	29,266	29,321	6.13	6.13	6.13
L2	A62, Oldham Road, West of Old Church Street, Slow Phase (SP)	27,544	29,266	29,321	6.13	6.13	6.13
L3	A62, Oldham Road, East of Old Church Street, SP	27,544	29,266	29,266	6.13	6.13	6.13
L4	A62, Oldham Road, West of Droylsden Road	27,544	29,266	29,266	6.13	6.13	6.13
L5	A62, Oldham Road, West of Droylsden Road, SP	27,544	29,266	29,266	6.13	6.13	6.13
L6	A62, Oldham Road, East of Droylsden Road, SP	27,544	29,266	29,377	6.13	6.13	6.13
L7	A62, Oldham Road, West of Rothwell Street	27,544	29,266	29,377	6.13	6.13	6.13
L8	A62, Oldham Road, West of Rothwell Street	27,544	29,266	29,377	6.13	6.13	6.13
L9	A62, Oldham Road, West of Albert Street West	27,544	29,266	29,377	6.13	6.13	6.13
L10	A62, Oldham Road, West of Poplar Street	27,544	29,266	29,377	6.13	6.13	6.13
L11	Droylsden Road, South of Great Newton Street	8,504	9,132	9,165	2.38	2.38	2.37
L12	Droylsden Road, South of Silk Street	7,780	8,354	8,382	2.37	2.37	2.36
L13	Droylsden Road, South of Holyoak Road	7,721	8,291	8,403	2.47	2.47	2.43
L14	Droylsden Road, South of A62, SP	7,721	8,291	8,403	2.47	2.47	2.43
L15	Culcheth Lane, North of Assheton Road	9,389	9,723	9,982	3.32	3.32	3.27
L16	Culcheth Lane, South of Great Newton Street	9,389	9,723	9,982	3.32	3.32	3.27
L17	Old Church Street, North of Great Newton Street	9,389	9,723	9,723	3.32	3.32	3.27
L18	Old Church Street, North of Silk Street	9,389	9,723	9,779	3.32	3.32	3.27
L19	Old Church Street, South of A62	9,389	9,723	9,779	3.32	3.32	3.27

Link		24-hour AADT Flow			HDV Proportion (%)		
		Verif.	2020 DM	2020 DS	Verif.	2020 DM	2020 DS
L20	Old Church Street, South of A62, SP	9,389	9,723	9,779	3.32	3.32	3.27
L21	Great Newton Street, East of Old Church Street	1,809	1,908	2,065	1.76	1.76	1.63
L22	Great Newton Street, East of Smallwood Street	1,846	1,983	1,983	1.08	1.08	1.08
L23	Great Newton Street, East of Cowley Street	1,660	1,783	1,783	1.27	1.27	1.27
L24	Silk Street, East of Old Church Street	418	448	504	0.00	0.00	0.00
L25	Silk Street, East of Smallwood Street	527	565	778	1.64	1.64	1.64
L26	Silk Street, West of Cowley Street	527	565	778	1.64	1.64	1.64
L27	Silk Street, East of Cowley Street	513	550	690	1.96	1.96	1.40
L28	Smallwood Street	391	420	577	1.64	1.64	1.19
L29	Cowley Street	88	95	95	0.00	0.00	0.00
L30	Oldham Road Eastbound (EB)	13,446	14,286	14,314	6.08	6.08	6.08
L31	Oldham Road Westbound (WB)	14,098	14,979	15,007	6.18	6.18	6.18
L32	Oldham Road WB Approaching Thorp Road Junction	14,098	14,979	15,007	6.18	6.18	6.18
L33	Oldham Road WB, Between Thorp Road and Elvey Street	14,098	14,979	15,007	6.18	6.18	6.18
L34	Oldham Road EB Approaching Thorp Road Junction	13,446	14,286	14,314	6.08	6.08	6.08
L35	Oldham Road EB, Between Thorp Road and Elvey Street	13,446	14,286	14,314	6.08	6.08	6.08
L36	Oldham Road Between Elvey Street and Hulme Hall Lane	27,544	29,266	29,321	6.13	6.13	6.13
L37	Thorp Road Approaching Oldham Road Junction	15,040	15,979	15,979	4.18	4.18	4.18
L38	Thorp Road Approaching Oldham Road Junction	15,040	15,979	15,979	4.18	4.18	4.18
L39	Thorp Road Approaching Thorp Road Roundabout	15,040	15,979	15,979	4.18	4.18	4.18

Link		24-hour AADT Flow			HDV Proportion (%)		
		Verif.	2020 DM	2020 DS	Verif.	2020 DM	2020 DS
L40	Lightbowne Road Approaching B6393 Roundabout	15,040	15,979	15,979	4.18	4.18	4.18
L41	Lightbowne Road B6393	15,040	15,979	15,979	4.18	4.18	4.18
L42	Oldham Road Approaching Hulme Hill Lane Junction	27,544	29,266	29,321	6.13	6.13	6.13
L43	Oldham Road Central Junction	19,589	20,813	20,813	6.15	6.15	6.15
L44	Oldham Road Exiting Hulme Hill Lane Junction	19,589	20,813	20,813	6.15	6.15	6.15
L45	Oldham Road West of Hulme Hill Lane	19,589	20,813	20,869	6.15	6.15	6.15
L46	Hulme Hill Lane Southbound (SB)	11,563	12,285	12,285	3.60	3.60	3.60
L47	Hulme Hill Lane SB	12,848	13,650	13,650	3.60	3.60	3.60
L48	Hulme Hill Lane Slip Road	2,570	2,730	2,730	3.60	3.60	3.60
L49	Hulme Hill Lane Northbound (NB) Approaching Oldham Road Junction	11,563	12,285	12,285	3.60	3.60	3.60
L50	Hulme Hill Lane NB	12,848	13,650	13,650	3.60	3.60	3.60
L51	Queens Road NB	8,252	8,767	8,767	5.30	5.30	5.30
L52	Queens Road SB	8,252	8,767	8,767	5.30	5.30	5.30
L53	Queens Road	16,503	17,534	17,534	5.30	5.30	5.30
L54	Oldham Road Approaching Broadway Junction	27,544	29,266	29,377	6.13	6.13	6.13
L55	Broadway NB	8,426	8,953	8,953	3.87	3.87	3.87
L56	Broadway SB/ Oldham Road Junction	4,213	4,476	4,476	3.87	3.87	3.87
L57	Broadway SB Approaching Oldham Road Junction	8,426	8,953	8,953	3.87	3.87	3.87
L58	Broadway SB	8,426	8,953	8,953	3.87	3.87	3.87
L59	Oldham Road Approaching Broadway Junction from East	16,793	17,843	17,954	4.60	4.60	4.60
L60	Oldham Road East of Broadway	16,793	17,843	17,954	4.60	4.60	4.60
L61	Broadway SB Slip Road	4,213	4,476	4,476	3.87	3.87	3.87

Link		24-hour AADT Flow			HDV Proportion (%)		
		Verif.	2020 DM	2020 DS	Verif.	2020 DM	2020 DS
L62	Scropton Street, East of Rochdale Road	8,252	8,767	8,767	5.30	5.30	5.30
L63	Queens Road, North of Crompton Street	8,252	8,767	8,767	5.30	5.30	5.30
L64	Scropton Street, West of Rochdale Road	9,615	10,215	10,215	2.86	2.86	2.86
L65	Queens Road, North of Scropton Street	9,615	10,215	10,215	2.86	2.86	2.86
L66	Rochdale Road to Queens Road NB	8,072	8,577	8,577	6.97	6.97	6.97
L67	Rochdale Road to Queens Road SB	8,072	8,577	8,577	6.97	6.97	6.97
L68	Rochdale Road, North of Queens Road, NB	9,082	9,649	9,649	5.19	5.19	5.19
L69	Rochdale Road, North of Queens Road, SB, SP	9,082	9,649	9,649	5.19	5.19	5.19
L70	Rochdale Road, North of Queens Road, SB	9,082	9,649	9,649	5.19	5.19	5.19
L71	Queens Road, East of Rochdale Road	19,229	20,431	20,431	2.86	2.86	2.86
L72	Rochdale Road, South of Queens Road, SB	7,063	7,504	7,504	6.97	6.97	6.97
L73	Rochdale Road, South of Queens Road, NB, SP	7,063	7,504	7,504	6.97	6.97	6.97
L74	Rochdale Road, South of Queens Road, NB	7,063	7,504	7,504	6.97	6.97	6.97
L75	Rochdale Road	14,126	15,009	15,009	6.97	6.97	6.97
L76	Oldham Road NB	9,795	10,407	10,462	6.15	6.15	6.15
L77	Oldham Road SB	9,795	10,407	10,462	6.15	6.15	6.15
R1	Thorp Road Roundabout	15,040	15,979	15,979	4.18	4.18	4.18
L1	A62, Oldham Road, West of Old Church Street	27,544	29,266	29,321	6.13	6.13	6.13

Reference should be made to Figure 11 for a graphical representation of the road link locations.

Road widths were estimated from aerial photography and UK highway design standards. A summary of the link parameters is provided in Table A1.2.

Table A1.2 Road Parameters

Link		Road Width (m)	Average Vehicle Speed (km/h)
L1	A62, Oldham Road, West of Old Church Street	13.1	40
L2	A62, Oldham Road, West of Old Church Street, SP	17.5	25
L3	A62, Oldham Road, East of Old Church Street, SP	18.4	25
L4	A62, Oldham Road, West of Droylsden Road	12.3	40
L5	A62, Oldham Road, West of Droylsden Road, SP	13.3	25
L6	A62, Oldham Road, East of Droylsden Road, SP	13.1	25
L7	A62, Oldham Road, West of Rothwell Street	12.5	40
L8	A62, Oldham Road, West of Rothwell Street	15.8	40
L9	A62, Oldham Road, West of Albert Street West	12.5	40
L10	A62, Oldham Road, West of Poplar Street	18.0	40
L11	Droylsden Road, South of Great Newton Street	7.1	30
L12	Droylsden Road, South of Silk Street	6.5	30
L13	Droylsden Road, South of Holyoak Road	7.0	30
L14	Droylsden Road, South of A62, SP	6.9	25
L15	Culcheth Lane, North of Assheton Road	6.1	30
L16	Culcheth Lane, South of Great Newton Street	5.9	30
L17	Old Church Street, North of Great Newton Street	5.8	30
L18	Old Church Street, North of Silk Street	6.4	30
L19	Old Church Street, South of A62	6.1	30
L20	Old Church Street, South of A62, SP	9.4	25
L21	Great Newton Street, East of Old Church Street	5.6	30
L22	Great Newton Street, East of Smallwood Street	6.5	30
L23	Great Newton Street, East of Cowley Street	5.5	30
L24	Silk Street, East of Old Church Street	6.3	30
L25	Silk Street, East of Smallwood Street	5.5	30
L26	Silk Street, West of Cowley Street	5.6	30

Link		Road Width (m)	Average Vehicle Speed (km/h)
L27	Silk Street, East of Cowley Street	5.2	30
L28	Smallwood Street	8.6	30
L29	Cowley Street	6.3	30
L30	Oldham Road EB	9.6	40
L31	Oldham Road WB	6.5	40
L32	Oldham Road WB Approaching Thorp Road Junction	8.9	30
L33	Oldham Road WB, Between Thorp Road and Elvey Street	14.5	40
L34	Oldham Road EB Approaching Thorp Road Junction	12.6	30
L35	Oldham Road EB, Between Thorp Road and Elvey Street	6.2	40
L36	Oldham Road Between Elvey Street and Hulme Hill Lane	13.9	40
L37	Thorp Road Approaching Oldham Road Junction	11.7	30
L38	Thorp Road Approaching Oldham Road Junction	7.8	40
L39	Thorp Road Approaching Thorp Road Roundabout	13.6	30
L40	Lightbowne Road Approaching B6393 Roundabout	13.6	30
L41	Lightbowne Road B6393	7.8	45
L42	Oldham Road Approaching Hulme Hill Lane Junction	12.9	25
L43	Oldham Road Central Junction	12.1	25
L44	Oldham Road Exiting Hulme Hill Lane Junction	16.3	25
L45	Oldham Road West of Hulme Hill Lane	13.4	45
L46	Hulme Hill Lane SB	8.0	45
L47	Hulme Hill Lane SB	8.0	45
L48	Hulme Hill Lane Slip Road	8.7	25
L49	Hulme Hill Lane NB Approaching Oldham Road Junction	12.0	25
L50	Hulme Hill Lane NB	6.7	45
L51	Queens Road NB	9.9	45
L52	Queens Road SB	10.7	25
L53	Queens Road	8.5	45

Link		Road Width (m)	Average Vehicle Speed (km/h)
L54	Oldham Road Approaching Broadway Junction	12.0	25
L55	Broadway NB	6.4	65
L56	Broadway SB/ Oldham Road Junction	7.2	25
L57	Broadway SB Approaching Oldham Road Junction	9.6	25
L58	Broadway SB	6.7	65
L59	Oldham Road Approaching Broadway Junction from East	12.7	25
L60	Oldham Road East of Broadway	13.4	45
L61	Broadway SB Slip Road	4.5	25
L62	Scropton Street, East of Rochdale Road	13.0	35
L63	Queens Road, North of Crompton Street	8.6	45
L64	Scropton Street, West of Rochdale Road	7.0	45
L65	Queens Road, North of Scropton Street	9.2	25
L66	Rochdale Road to Queens Road NB	10.2	30
L67	Rochdale Road to Queens Road SB	11.0	30
L68	Rochdale Road, North of Queens Road, NB	9.2	45
L69	Rochdale Road, North of Queens Road, SB, SP	8.8	45
L70	Rochdale Road, North of Queens Road, SB	9.7	25
L71	Queens Road, East of Rochdale Road	8.9	45
L72	Rochdale Road, South of Queens Road, SB	4.2	45
L73	Rochdale Road, South of Queens Road, NB, SP	11.3	25
L74	Rochdale Road, South of Queens Road, NB	6.2	45
L75	Rochdale Road	8.6	45
L76	Oldham Road NB	7.8	45
L77	Oldham Road SB	8.6	45
R1	Thorp Road Roundabout	8.6	30

Canyons

Where buildings or walls surround roads, pollutant dispersion patterns are altered which can lead to high pollutant concentrations. These street canyons can significantly influence air quality along a road and therefore it is important to take consideration of their effects when undertaking dispersion modelling.

The release of ADMS-Roads version 4.0.1.0 in December 2015 incorporated a number of new features including an advanced street canyon module, which have been retained in version 4.1.1.0. Advanced street canyon modelling allows a number of parameters to be included in the dispersion model in order to predict pollutant dispersion patterns which better reflect air flow within complex urban geometries.

Canyons have five principle effects on dispersion which can influence pollutant concentrations. These are:

- Pollutants are channelled along street canyons;
- Pollutants are dispersed across street canyons by circulating flow at road height;
- Pollutants are trapped in recirculation regions;
- Pollutants leave the canyon through gaps between buildings - as if there was no canyon; and,
- Pollutants leave the canyon from the canyon top.

The combined modelling of these effects will result in concentration patterns unique to each canyon.

The parameters used in the assessment are outlined in Table A1.3.

Table A1.3 Canyon Parameters

Link	Parameter (m)							
	Canyon Width to Left	Average Height of Buildings to Left	Canyon Length Left	Building Length Left	Canyon Width Right	Average Height of Buildings to Right	Canyon Length Right	Building Length Right
L16	6.00	5.50	34.96	22.87	8.40	7.50	34.96	27.63
L17	7.50	7.50	81.21	55.93	6.80	7.00	81.21	70.63

Link	Parameter (m)							
	Canyon Width to Left	Average Height of Buildings to Left	Canyon Length Left	Building Length Left	Canyon Width Right	Average Height of Buildings to Right	Canyon Length Right	Building Length Right
L18	7.10	7.50	69.58	64.58	5.60	7.00	69.58	42.37
L21	5.50	7.50	33.97	13.28	7.00	7.50	33.97	17.65
L24	5.00	7.50	35.89	16.66	5.80	5.00	35.89	8.63

A choice of two modes is provided for use in the advanced canyon module. Standard mode assumes that each road is part of a continuous network of roads with similar canyon properties. Network mode analyses the road network to determine transport of pollutants between adjoining street canyons, allows for varying concentrations along the canyon and accounts for transport of pollutants out of the end of a canyon. Network mode is considered most accurate for detailed local analysis and as such was the mode selected for use in the model.

Emission Factors

The emission factors were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 8.0.1). This has been produced by DEFRA and incorporates COPERT 5 vehicle emission factors and fleet information.

There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2017 emission factors were utilised in preference to the development opening year in order to provide robust model outputs. As predictions for 2017 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Manchester Airport meteorological station over the period 1st January 2017 to 31st December 2017 (inclusive). Manchester Airport meteorological station is located at NGR: 381792, 384116, which is approximately 17.6km south-west of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 3 for a wind rose of utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

A z_0 of 0.2m was used to describe the meteorological site. This value of z_0 is considered appropriate for the morphology of the area due to the large expanse of surrounding flat land use, such as runways and grassland, and is suggested within ADMS-Roads as being suitable for 'agricultural areas (min)'.

Monin-Obukhov Length

A minimum Monin-Obukhov length of 30m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Background Concentrations

Annual mean NO₂, PM₁₀ and PM_{2.5} background concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the 88 - A57 Hyde Road and Clowes Street diffusion tube, NGR: 385500, 399500. These are shown in Table A1.4.

Table A1.4 Background Concentrations - Modelling Extents

Pollutant	Predicted 2017 Background Pollutant Concentration (µg/m ³)
NO ₂	23.62
PM ₁₀	14.01
PM _{2.5}	8.95

The values shown in Table A1.4 were chosen to represent concentrations throughout the dispersion modelling extents without the contribution from road vehicles as they were higher than the DEFRA background for the grid square containing the site, as shown in Table 13.

Similarly to emission factors, the background concentrations from 2017 were utilised in preference to the future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 6.1) provided by DEFRA, which is the method detailed within DEFRA guidance²¹.

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of the assessment, model verification was undertaken for 2017 using traffic data, meteorological data and monitoring results from this year.

MCC and OMBC undertook diffusion tube monitoring of NO₂ concentrations at one location within the vicinity of roads included within the dispersion model during 2017. The result was

²¹ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

obtained and the road contribution to total NO_x concentration calculated following the methodology contained within DEFRA guidance²². The monitored annual mean NO₂ concentrations and calculated road NO_x concentration is summarised in Table A1.5.

Table A1.5 Verification - Monitoring Result

Monitoring Location		Monitored NO ₂ Concentrations (µg/m ³)	Calculated Road NO _x Concentrations (µg/m ³)
36	Rochdale Road	34.4	22.16

The annual mean road NO_x concentration predicted from the dispersion model and the 2017 road NO_x concentration calculated from the NO₂ monitoring result is summarised in Table A1.6.

Table A1.6 Verification - Modelling Result

Monitoring Location		Calculated Road NO _x Concentrations (µg/m ³)	Modelled Road NO _x Concentrations (µg/m ³)
36	Rochdale Road	22.16	16.79

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.3196 was required to be applied to all road NO_x modelling results.

Monitoring of PM₁₀ and PM_{2.5} concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM₁₀ and PM_{2.5} model predictions in lieu of more accurate data in accordance with DEFRA guidance²³.

²² Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

²³ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Appendix 2 - Curricula Vitae

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-5, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

SELECT PROJECTS SUMMARY:

Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.

KEY EXPERIENCE:

Amelia is an Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality.
- Advanced canyon modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Assessment of construction dust impacts from a range of development sizes.
- Definition of baseline air quality and identification of sensitive areas across the UK.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Air quality monitoring at industrial sites to quantify pollutant concentrations
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.

SELECT PROJECTS SUMMARY:

Eagle House, South Ruislip

Air Quality Assessment for the change of use from an office block to a hotel in an Air Quality Management Area (AQMA). Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM₁₀ and NO₂ concentrations across the site as well as an Air Quality Neutral Assessment in accordance with the London Plan requirements. Results revealed that pollution levels were below the air quality standards across the development.

Parr Bridge, Tyldesley

Air Quality Assessment to support a residential development of 154 units. Dispersion modelling was undertaken due to the proximity of the site to an AQMA. Using sensitive receptors located in areas where increased road traffic may affect NO₂ levels, a comparison was made between concentrations with and without the development in place. Results indicated the impacts were not significant.

St James's Street, Westminster

Air Quality Assessment in support of a mixed-use development in an AQMA. Dispersion modelling was undertaken at several different heights reflective of residential units within the development. Predicted concentrations of NO₂ were found to exceed air quality criteria from ground to third floor level. As such, mitigation was specified for the affected units to ensure future residents would not be exposed to poor air quality.

Rookery Avenue, Whiteley, Farnborough

Odour Impact Assessment in support of a hot food takeaway with a drive thru facility in Whiteley. The assessment considered a number of factors, including the scale and nature of potential emissions, the location of nearest receptors and the proposed cooking type in accordance with the relevant DEFRA guidance. An appropriate ventilation system was identified and described on the basis of the assessment results.

Hoole Way, Chester

Air Quality Assessment in support of an eight-storey student accommodation block to provide circa 373 units on land off Hoole Way, Chester. Concerns had been raised in relation to the potential exposure of future occupants to elevated pollution concentrations. An assessment was therefore undertaken using dispersion modelling in order to quantify air quality conditions across the site. The results revealed that the use of good practice control measures would provide suitable mitigation for the development.

St James Place, Liverpool

Air Quality Assessment in support of a residential-led development located across three different sites in an AQMA on land off St James Place, Liverpool. Detailed dispersion modelling was undertaken with the inclusion of advanced canyon modelling to evaluate the impact of the urban topography within the locality on the dispersion of traffic related pollutants. The results revealed pollutant concentrations were below the relevant standards across the site.