Air Quality Assessment

39 Mason Street, Manchester

Client: Linson Construction Pension Fund

Reference: 1905r1

Date: 6th November 2017



Report Issue

Report Title: Air Quality Assessment - 39 Mason Street, Manchester

Report Reference: 1905

Field	Report Version			
	1	2	3	4
Prepared by	Elen Owen			
Position	Senior Air Quality Consultant			
Reviewed by	Emily Pears-Ryding			
Position	Air Quality Consultant			
Authorised by	Jethro Redmore			
Position	Director			
Date of Issue	6th November 2017			
Comments	-			

Heliport Business Park, Liverpool Road, Manchester, M30 7RU

info@red-env.co.uk | 0161 706 0075 | www.red-env.co.uk

This report has been prepared by Redmore Environmental Ltd in accordance with the agreed terms and conditions of appointment. Redmore Environmental Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Executive Summary

Redmore Environmental Ltd was commissioned by Linson Construction Pension Fund to undertake an Air Quality Assessment in support of a planning application for a residential-led development at 39 Mason Street, Manchester.

The proposals comprise the erection of a six-storey building to provide 14 residential apartments with ground floor retail and restaurant space and basement level parking.

The development may lead to the exposure of future users to elevated pollution levels, as well as adverse air quality impacts at sensitive locations. As such, an Air Quality Assessment has been requested by Manchester City Council in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential impacts 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 proposals of this size and nature and reduce potential impacts to an acceptable level.

During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the relevant screening criteria. Due to the low number of trips predicted to be generated by the scheme, road traffic impacts were not predicted to be significant.

There is the potential for the exposure of future users to elevated pollution levels. Dispersion modelling was therefore undertaken in order to predict concentrations across the proposed development site as a result of emissions from the highway network. Results were subsequently verified using local monitoring data.

The results of the dispersion modelling assessment indicated that predicted pollution levels were above the relevant air quality criteria across the first floor. Suitable mitigation in the form of a mechanical ventilation system was therefore specified for all units on the first floor in order to ensure a supply of clean air for future occupants.

Based on the assessment results, air quality issues are not considered a constraint to planning consent for the proposals, subject to the inclusion of the specified mitigation.

Table of Contents

1.0	**INTRODUCTION**	**1**
1.1	Background	1
1.2	Site Location and Context	1
2.0	**LEGISLATION AND POLICY**	**2**
2.1	European Directives	2
2.2	UK Legislation	2
2.3	Local Air Quality Management	4
2.4	Dust	5
2.5	National Planning Policy	5
2.6	National Planning Practice Guidance	6
2.7	Local Planning Policy	7
3.0	**METHODOLOGY**	**8**
3.1	Introduction	8
3.2	Construction Phase Assessment	8
	Step 1	9
	Step 2	9
	Step 3	15
	Step 4	15
3.3	Operational Phase Assessment	15
	Potential Development Impacts	15
	Potential Future Exposure	17
4.0	**BASELINE**	**18**
4.1	Introduction	18
4.2	Local Air Quality Management	18
4.3	Air Quality Monitoring	18
4.4	Background Pollutant Concentrations	19
4.5	Sensitive Receptors	20
5.0	**ASSESSMENT**	**23**
5.1	Introduction	23
5.2	Construction Phase Assessment	23
	Step 1	23
	Step 2	23
	Step 3	25
	Step 4	27
5.3	Operational Phase Assessment	27

Potential Development Impacts 27
Potential Future Exposure 28
6.0 MITIGATION 30
7.0 CONCLUSION 33
8.0 ABBREVIATIONS 35

Appendices

Appendix 1 - Assessment Input Data
Appendix 2 - Curricula Vitae

1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Linson Construction Pension Fund to undertake an Air Quality Assessment in support of a planning application for a residential-led development at 39 Mason Street, Manchester.

1.1.2 The development may lead to the exposure of future users to poor air quality, as well as adverse impacts at sensitive locations. As such, an Air Quality Assessment was requested by Manchester City Council (MCC) in order to determine baseline conditions at the site, consider the suitability for the proposed end-use and assess potential impacts associated with the scheme.

1.2 Site Location and Context

1.2.1 The site is located at 39 Mason Street, Manchester, at approximate National Grid Reference (NGR): 384583, 398901. 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 a six-storey building to include 14 residential units across the first to sixth floor with ground floor retail and restaurant use and basement level parking.

1.2.3 MCC has declared an Air Quality Management Area (AQMA) due to exceedences of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO_2). The development is located within the AQMA. Subsequently, there are concerns that the proposals will introduce future users to exceedences of the relevant AQO. As such, concentrations at the site have been assessed in the following report in order to consider location suitability for the proposed end-use and define any requirement for mitigation. Potential impacts associated with the scheme have also been considered using standard assessment methodologies.

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 NO_2, oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- 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 2007[1]. The AQS sets out 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 (µg/m³)	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 (µg/m³)	Averaging Period
$PM_{2.5}$	25	Annual mean

2.2.5 Table 3 summarises the advice provided in DEFRA guidance[2] on where the AQOs and AQTV for pollutants considered within this report apply.

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

[2] Local Air Quality Management (TG16), DEFRA, 2016.

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 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), 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 practice measures.

2.5 National Planning Policy

2.5.1 The National Planning Policy Framework[3] (NPPF) was published on 27th March 2012 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to the proposed development:

> "The planning system should contribute to and enhance the natural and local environment by: […]
>
> Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"

[3] NPPF, Department for Communities and Local Government, 2012.

> "Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

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

2.6 National Planning Practice Guidance

2.6.1 The National Planning Practice Guidance[4] (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.

[4] http://planningguidance.planningportal.gov.uk.

2.7 Local Planning Policy

2.7.1 The Manchester Local Development Framework consists of a series of planning documents of which the Core Strategy[5] is central. This was adopted by 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 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.

[5] Core Strategy, MCC, 2012.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposals have the potential to cause air quality impacts during the construction and operational phases, as well as expose future occupants to elevated pollution levels. These issues have been assessed in accordance with the following methodology. This was agreed with Laura Miller, Neighbourhood Officer at MCC, on 25th October 2017.

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 PM_{10}.

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
Large	Earthworks	• Total site area greater than 10,000m^2 • 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 100,000m^3 • 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 2,500m^2 to 10,000m^2 • 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 25,000m^3 to 100,000m^3 • 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 2,500m^2 • 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 25,000m^3 • 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

3.2.10 Step 2B defines the sensitivity of the area around the developments 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 PM_{10}. 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, playing fields, shopping streets, farmland, short term car park and roads	• Locally designated site e.g. Local Nature Reserve

3.2.11 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.

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

3.2.13 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

3.2.14 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
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	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
	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	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	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	Low

3.2.15 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

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

3.2.16 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

3.2.17 Table 9 outlines the risk category 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

3.2.18 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

3.2.19 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance[7] 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

3.2.20 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**.

3.2.21 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

Potential Development Impacts

3.3.1 The proposals have the potential to impact on existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the Highways Agency 'Design Manual for Roads and Bridges' (DMRB)[8] and IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[9] guidance documents to determine the potential for trips generated by the scheme to affect local air quality.

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

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

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

3.3.2 The DMRB[10] provides the following criteria for determination of road links potentially affected by changes in traffic flow:

- Annual Average Daily Traffic (AADT) flows change by 1,000 or more;
- Daily HDV AADT flows change by 200 or more;
- Daily average speed changes by 10km/hr or more; or,
- Peak hour speed changes by 20km/hr or more.

3.3.3 The IAQM 'Land-Use Planning & Development Control: Planning for Air Quality' guidance[11] document provides the following criteria to help establish when an assessment of potential impacts on the local area is likely to be considered necessary:

- A change of Light Duty Vehicle (LDV) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- Realignment of roads where the change is 5m or more and the road is within an AQMA; or,
- Introduction of a new junction or removal of an existing junction near to relevant receptors.

3.3.4 Should these criteria not be met, then the DMRB[12] and IAQM guidance[13] documents consider air quality impacts associated with a scheme to be **negligible** and no further assessment is required.

3.3.5 Should screening of the relevant data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the change in pollutant concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the IAQM guidance[14].

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

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

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

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

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

Potential Future Exposure

3.3.6 The proposals have the potential to expose future users to poor air quality. In order to assess NO_2, PM_{10} and $PM_{2.5}$ concentrations across the development site, detailed dispersion modelling was therefore undertaken. Reference should be made to Appendix 1 for a full description of the assessment input data.

3.3.7 Results of the dispersion modelling were compared against the relevant AQOs and AQTV in order to determine the potential for exposure of future occupants to elevated pollutant concentrations and identify appropriate mitigation, if necessary.

4.0 BASELINE

4.1 Introduction

4.1.1 Existing air quality conditions in the vicinity of the proposals 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 NO_2 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 within the AQMA. As such, there is the potential for the exposure of future residents to poor air quality and vehicles travelling to and from the site to increase pollution levels in this sensitive area. These issues have been considered throughout the assessment.

4.2.3 MCC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 Air Quality Monitoring

4.3.1 Monitoring of pollutant concentrations is undertaken by MCC throughout their area of jurisdiction. Recent results recorded in the vicinity of the proposals are shown in Table 11.

Table 11 Monitoring Results

Monitoring Site		Monitored NO_2 Concentration (µg/m³)		
		2014	2015	2016
85	Angel Street, City Centre	**53.46**	**52.21**	**51.22**

4.3.2 As shown in Table 11, the annual mean AQO for NO_2 was exceeded at the 85 - Angel Street, City Centre, diffusion tube in recent years. As the site is located adjacent to a road within an AQMA, elevated concentrations would be expected. Reference should be made to Figure 3 for a map of the monitoring position.

4.3.3 MCC do not undertake PM_{10} 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: 384500, 398500. Data for this location was downloaded from the DEFRA website[15] for the purpose of the assessment and is summarised in Table 12.

Table 12 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2016	2017	2019
NO_2	33.48	32.07	29.23
PM_{10}	17.92	17.71	17.29
$PM_{2.5}$	12.65	12.44	12.02

4.4.2 As shown in Table 12, predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQOs and AQTV at the development site.

15 http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013.

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. 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 boundaries. These are summarised in Table 13.

Table 13 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	1 to 10	0
Up to 50	More than 100	0
Up to 100	More than 100	-
Up to 350	More than 100	-

4.5.2 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 routes. These are summarised in Table 14. For the purpose of the assessment it was assumed construction phase traffic would access the development site from Mason Street. This ensured a worst-case assessment.

Table 14 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

4.5.3 There are no ecological receptors within 50m of the site or trackout boundaries. As such, ecological impacts have not been assessed further within this report.

4.5.4 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 15.

Table 15 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study indicated that there have been a number of developments consented and erected in the vicinity of the proposed site within the last two years. As such, it is likely that there has been frequent construction dust production and dispersion within the area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal indicated a number of applications have recently been granted planning permission within 700m of the site: • Planning reference: 1111827/FO/2016/N1 - erection of a 172 bedroom hotel approximately 40m south-west of the site • Planning reference: 112015/FO/2016/N1 - erection of 274 residential apartment block approximately 120m south-east of the site. • Planning reference: 109840/FO/2015/N1 - erection of a 103 unit residential apartment building subsequent to demolition of existing buildings approximately 80m south of the site • Planning reference: 116777/FO/2017 - erection of a 100 unit residential apartment building subsequent to demolition of existing buildings approximately 80m north-west of the site • Planning reference: 111347/FO/2016/N1 - erection of part 7 part 35 storey mixed use development known as NOMA plot L approximately 85m north-west of the site It is therefore possible that there will be concurrent dust generation in the area should the construction phases overlap
Pre-existing screening between the source and the receptors	The development is located within a built up urban area and is surrounded by buildings. This would limit the dispersion of dust to receptors in this area. There is no other significant screening around the site
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 4, the predominant wind bearing is from the south. As such, receptors to the north of the site are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion

Guidance	Comment
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 users would expect to enjoy a reasonable level of amenity, aesthetics or the value of their property could be diminished by soiling and people would be expected to be present for extended periods of time e.g. residential properties.

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 16.

Table 16 Sensitivity of the Surrounding Area

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

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 proposals. 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 is estimated to cover a total area of less than 2,500m^2. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from earthworks is therefore **small**.

5.2.5 Table 16 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 9, the scheme is considered to be a **low** risk site for dust soiling as a result of earthworks activities.

5.2.6 Table 16 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the scheme is considered to be a **negligible** risk site for human health impacts as a result of earthwork activities.

Construction

5.2.7 Due to the size and nature of the proposals, the total building volume is likely to be less than 25,000m^3. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from construction is therefore **small**.

5.2.8 Table 16 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 9, the scheme is considered to be a **low** risk site for dust soiling as a result of construction activities.

5.2.9 Table 16 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the scheme is considered to be a **negligible** risk site for human health impacts as a result of construction activities.

Trackout

5.2.10 Information on the number of HDV trips to be generated during the construction phase of the proposals was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project.

5.2.11 Based on the total site area and the access route comprising all tarmacked surfaces, it is anticipated that the unpaved road length will be less than 50m. In accordance with the criteria outlined in Table 4, the magnitude of potential dust emissions from trackout is therefore **small**.

5.2.12 Table 16 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 scheme is considered to be a **low** risk site for dust soiling as a result of trackout activities.

5.2.13 Table 16 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 10, the scheme 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

5.2.14 A summary of the risk from each dust generating activity is provided in Table 17.

Table 17 Summary of Potential Unmitigated Dust Risks

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

5.2.15 As indicated in Table 17, the potential risk of dust soiling is **low** from earthworks, construction and trackout. The potential risk of human health impacts is **negligible** earthworks, construction and trackout.

5.2.16 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 boundaries 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

5.2.17 The IAQM guidance[16] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the proposals as summarised in Table 18. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the LA.

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

Table 18 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• 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 • Fully enclose site or 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
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	• No bonfires or burning of waste materials

Issue	Control Measure
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	• Use water-assisted dust sweeper on access and local roads, if required • 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

5.2.18 Assuming the relevant mitigation measures outlined in Table 18 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with IAQM guidance[17].

5.3 Operational Phase Assessment

Potential Development Impacts

5.3.1 Any additional vehicle movements associated with the proposals will generate exhaust emissions on the local and regional road networks. Anticipated trip generation was obtained from the Transport Technical Note produced by SCP Transport, the Transport Consultants for the project. This indicated that a total of 272 daily vehicle movements are predicted to be generated by the development. However, the proposals only include parking spaces for use by the apartment residents, who are predicted to produce 21 daily two-way vehicle movements. The remaining trips are associated with the retail and restaurant use and will distributed throughout the local road network.

5.3.2 Based on the provided information, the proposals are not anticipated to result in an increase in AADT flows of more than 1,000, produce over 200 HDV movements per day or

[17] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2017.

significantly affect average speeds on the local road network. Additionally, the scheme is not considered likely to result in an increase of LDV flows of more than 100 AADT on any individual road link, include significant highway realignment or the introduction of a junction and there will not be a requirement for more than 25 HDV deliveries per day. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **negligible**, in accordance with the DMRB[18] and IAQM[19] screening criteria shown in Section 4.3.

Potential Future Exposure

5.3.3 The proposals have the potential to cause the exposure of future occupants 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 4 to 9 for graphical representations of the results.

5.3.4 It should be noted that the proposals comprise parking across the basement level, and restaurant and retail land use across the ground floor. As such, these are not considered locations of relevant exposure for annual mean AQOs and AQTVs in accordance with the advice provided within DEFRA guidance[20]. However, restaurants and retail units are considered locations of relevant exposure for short-term AQOs, including the 1-hour NO_2 AQO and the 24-hour PM_{10} AQO. These have therefore been considered at ground floor.

5.3.5 Dispersion models are inherently less accurate at calculating exceedences of short-term AQOs. As such, predictions of 1-hour NO_2 concentrations were not produced as part of the assessment. However, as stated in DEFRA guidance[21], if annual mean NO_2 concentrations are below 60µg/m^3 then it is unlikely that the 1-hour AQO will be exceeded. As shown in Figure 4, annual mean NO_2 concentrations were predicted to be below 60µg/m^3 at all locations across the ground floor. The maximum level at the site boundary was 43.00µg/m^3. As such, compliance with the relevant AQO is considered likely at the development location.

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

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

20 Local Air Quality Management (TG16), DEFRA, 2016.

21 Local Air Quality Management (TG16), DEFRA, 2016.

5.3.6 As shown in Figure 5, the number of days with PM_{10} concentrations greater than 50 was predicted to be below the permitted number of 35 across the site. The maximum number of days with concentrations above 50 at the site boundary was 3. As such, compliance with the relevant AQO is considered likely at the development location.

5.3.7 As shown in Figure 6, annual mean NO_2 concentrations at first floor level were predicted to be above the AQO of 40µg/m^3 across the majority of the development site. The maximum predicted level at the site boundary was 41.40µg/m^3.

5.3.8 As shown in Figure 7, annual mean NO_2 concentrations at second floor level were predicted to be below the AQO of 40µg/m^3 at all locations across the development site. The maximum level at the site boundary was 39.58µg/m^3. As such, future residents are not predicted to be exposed to NO_2 concentrations above the AQO.

5.3.9 As shown in Figure 8, annual mean PM_{10} concentrations at first floor level were predicted to be below the AQO of 40µg/m^3 at all locations across the development site. The maximum level at the site boundary was 19.16µg/m^3. As such, future residents are not predicted to be exposed to PM_{10} concentrations above the AQO.

5.3.10 As shown in Figure 9, annual mean $PM_{2.5}$ concentrations were predicted to be below the AQTV of 25µg/m^3 at all locations across the development site. The maximum level at the site boundary was 13.41µg/m^3. As such, future residents are not predicted to be exposed to $PM_{2.5}$ concentrations above the AQTV.

5.3.11 It should be noted that pollutant levels decrease with distance from pollutant sources. As concentrations were predicted to be below the relevant annual mean NO_2 AQO at 2nd floor level, and below the annual mean PM_{10} AQO and $PM_{2.5}$ AQTV at 1st floor level, further assessment above these heights was not considered necessary.

5.3.12 Based on the assessment results, it is recommended that mitigation is included to ensure future residents are not exposed to elevated NO_2 concentrations. Specific measures are described in Section 6.0.

6.0 MITIGATION

6.1.1 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.

6.1.2 Predicted annual mean NO_2 concentrations exceeded the AQO of 40µg/m^3 across all first floor residential units. As such, mitigation is required to ensure a supply of clean air for future occupants in these locations. This should be provided in the form of a mechanical ventilation system across all locations on the first floor of the development. The air inlet should be positioned at second floor level or a height of 6.2m or above. Alternatively, if there are design issues associated with providing inlets at the designated locations, a NO_2 absorption filter could be included within the system to reduce pollutant concentrations within the airstream prior to entering the units.

6.1.3 The arrangement will ensure the units are kept under positive pressure by providing air into the rooms, rather than removing it. This will naturally inhibit the movement of air from outside into the units during periods of open windows, as well as flushing the internal environment after closure.

6.1.4 Mechanical ventilation is suggested within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[22] guidance document and as such is considered a suitable solution for a development of this size and nature.

6.1.5 A number of mitigation measures have also been included within the development in accordance with the requirements of the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'[23] to encourage the use of sustainable transport modes, manage vehicle flow and reduce pollution around the site. Table 19 describes the good practice principles detailed in the IAQM guidance along with how each has been addressed with regards to the proposals.

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

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

Table 19 Good Practice Design Principles

Phase	Principle	Action
Design Phase	New developments should not contravene the Council's Air Quality Action Plan[24], 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 lead to the generation of street canyons along a small portion of Mason Street and Marshall Street. However, both streets are unclassified roads which are unlikely to have a significant number of traffic movements. As such, canyon effects are likely to be limited at the development
	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	As shown previously, exposure of future residents to exceedences of the relevant AQOs and AQTV was not predicted at any location above the first floor. Mitigation has been specified to limit exposure of future residents to poor air quality. The development includes less sensitive land-use at ground floor, reducing the potential for future exposure to elevated pollution concentrations
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 supplied to the site has not been finalised. However, it is recommended that one EV charging point is installed, which represents 10% of total residential units
	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 detailed Travel Plan will be produced in support of the development if considered necessary by MCC

[24] Greater Manchester Air Quality Action Plan (GMAQAP) 2016-2021, GMCA, 2016.

Phase	Principle	Action
	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/Nm^3; • Compression ignition engine: 400mgNO_x/Nm^3; • Gas turbine: 50mgNO_x/Nm^3. 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/Nm^3 and 25mgPM/Nm^3	Any boilers to be included in the development will be provisioned in accordance with the relevant requirements

6.1.6 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.

7.0 CONCLUSION

7.1.1 Redmore Environmental Ltd was commissioned by Linson Construction Pension Fund to undertake an Air Quality Assessment in support of a planning application for a residential-led development at 39 Mason Street, Manchester.

7.1.2 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 occupants 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.

7.1.3 During the construction phase of the proposals there is the potential for air quality impacts as a result of fugitive dust emissions from the scheme. 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**.

7.1.4 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 development site. These were assessed against the screening criteria provided within the DMRB[25] and IAQM[26] guidance documents. Due to the low number of trips predicted to be generated by the scheme, road traffic impacts were predicted to be **negligible**.

7.1.5 The proposals have the potential to expose future occupants to elevated pollution levels. Dispersion modelling was therefore undertaken using ADMS-Roads in order to predict concentrations as a result of emissions from the local highway network. Results were subsequently verified using monitoring data collected by MCC.

7.1.6 The results of the dispersion modelling assessment indicated that predicted annual mean NO_2 concentrations were above the relevant AQO at first floor level. As such, suitable mitigation in the form of mechanical ventilation has been specified for the affected units.

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

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

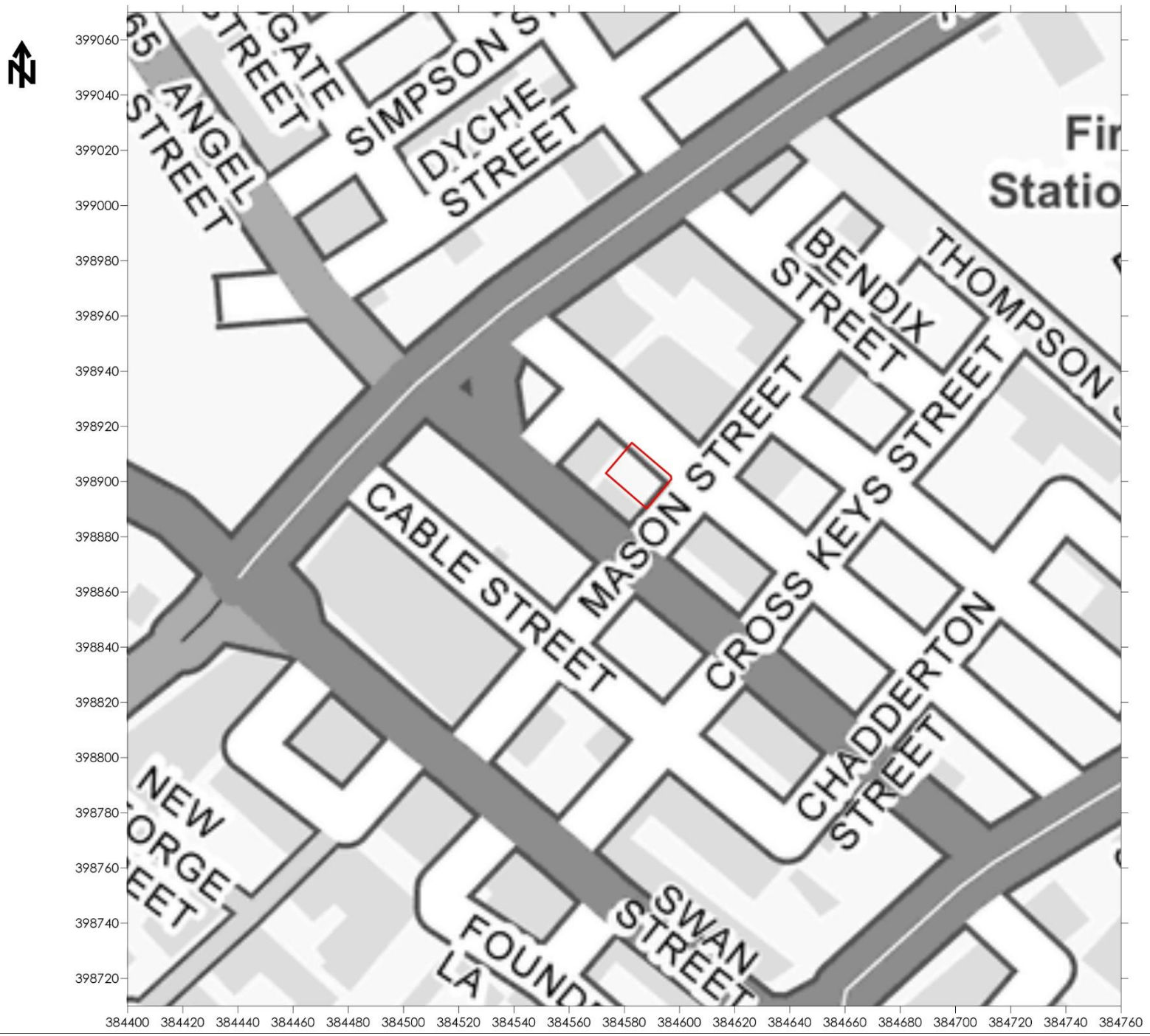
This should ensure future residents are not exposed to poor air quality. Concentrations of PM_{10} and $PM_{2.5}$ were below the relevant criteria at all locations across the site.

7.1.7 Based on the assessment results, air quality issues are not considered a constraint to planning consent for the proposals, subject to the inclusion of the specified mitigation.

8.0 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
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
EB	Eastbound
EU	European Union
EV	Electric Vehicle
GMAQAP	Greater Manchester Air Quality Action Plan
GMCA	Grater 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
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
PM_{10}	Particulate Matter with an aerodynamic diameter of less than 10µm
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter of less than 2.5µm
SB	Southbound
SP	Slow Phase
z_0	Roughness length

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location Plan

Project
Air Quality Assessment
Mason Street, Manchester

Project Reference
1905

Client
Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental
www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Monitoring Locations

Title
Figure 2 - Monitoring Locations

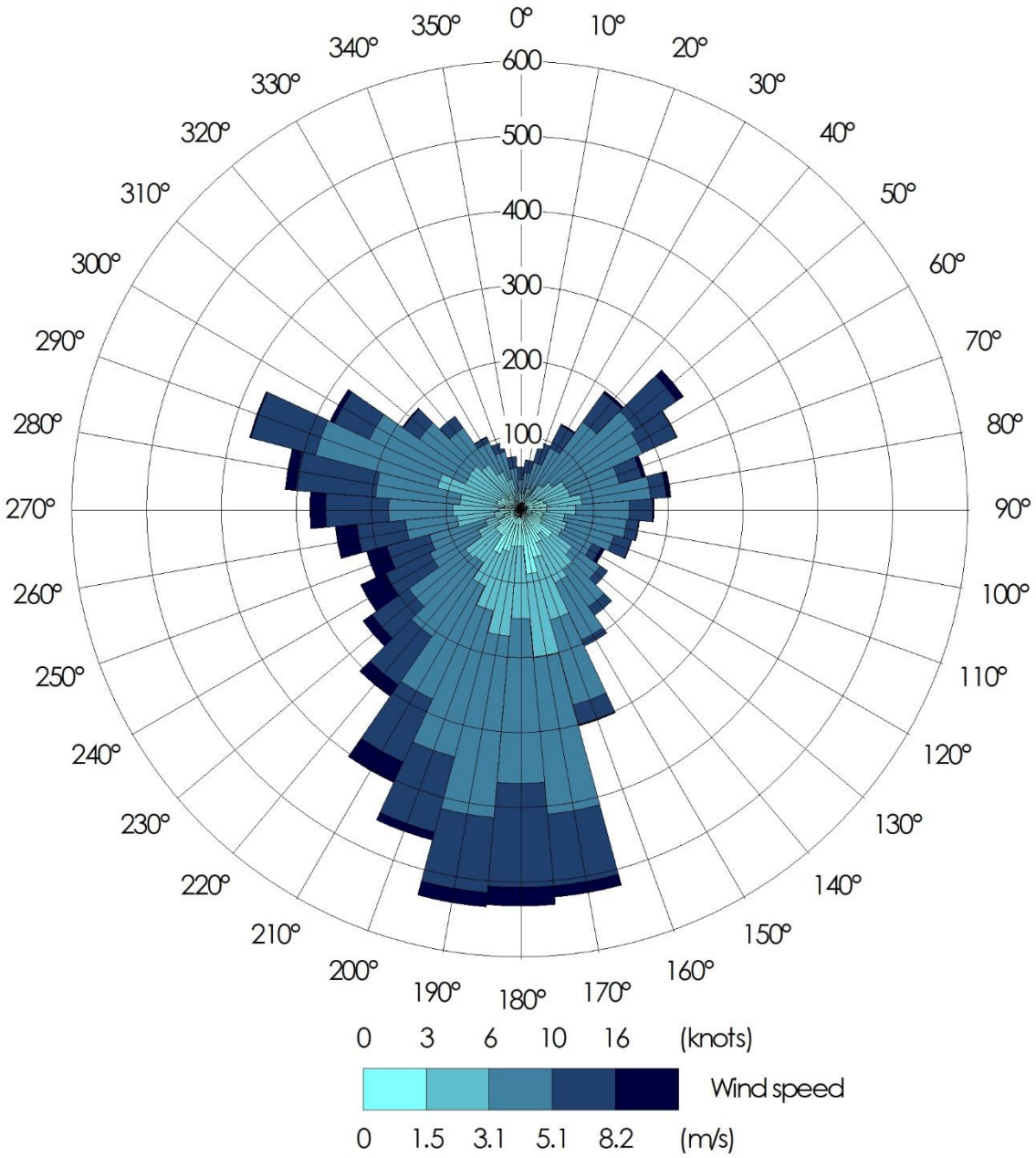
Project
Air Quality Assessment
Mason Street, Manchester

Project Reference
1905

Client
Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental
www.red-env.co.uk | 0161 7060075



Legend

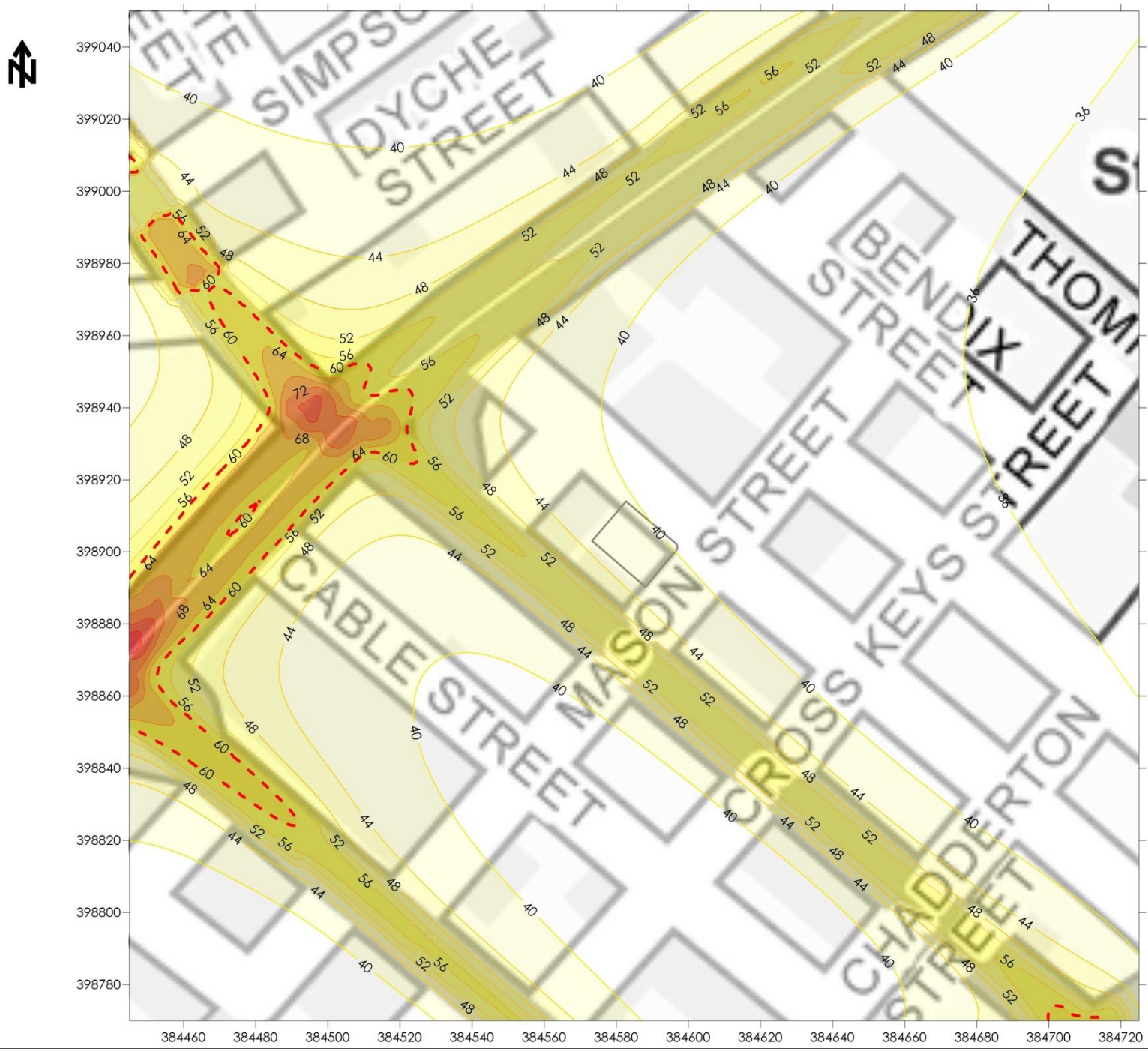
Title
Figure 3 - Wind Rose of 2016
Manchester Airport
Meteorological Data

Project
Air Quality Assessment
Mason Street, Manchester

Project Reference
1905

Client
Linson Construction Pension Fund

Redmore environmental
www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Annual Mean NO_2 Concentration ($\mu g/m^3$)

80
76
72
68
64
60
56
52
48
44
40
36

60$\mu g/m^3$

Title

Figure 4 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)
Ground Floor

Project

Air Quality Assessment
Mason Street, Manchester

Project Reference

1905

Client

Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental

www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Predicted Number of Days with PM_{10} Concentrations Greater than 50µg/m³

14
12
10
8
6
4
2

Title

Figure 5 - Predicted Number of Days with PM_{10} Concentrations Greater than 50µg/m³
Ground Floor

Project

Air Quality Assessment
Mason Street, Manchester

Project Reference

1905

Client

Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental

www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Annual Mean NO_2 Concentration ($\mu g/m^3$)

56
52
48
44
40
36

Title

Figure 6 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)
First Floor

Project

Air Quality Assessment
Mason Street, Manchester

Project Reference

1905

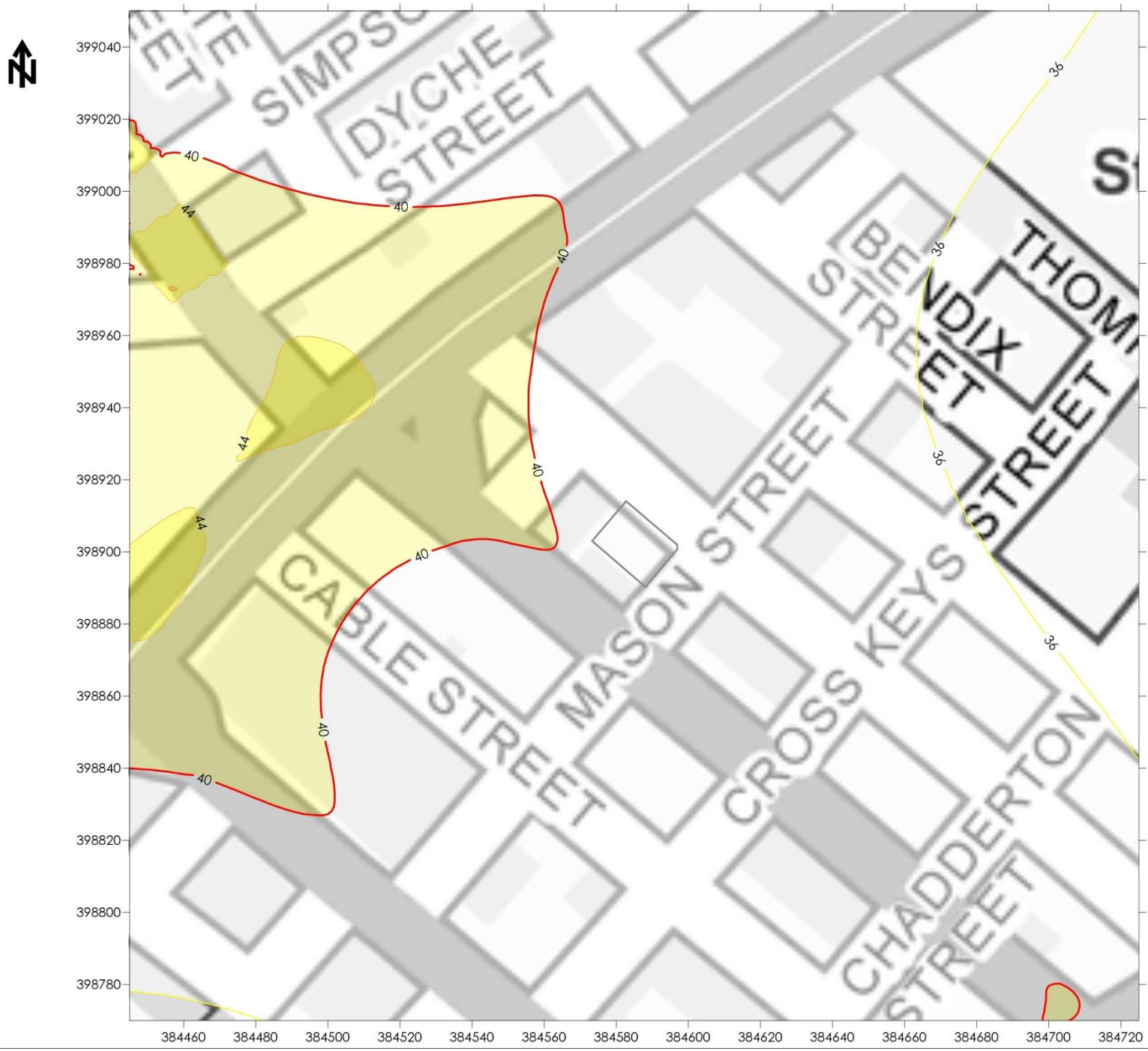
Client

Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental

www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Annual Mean NO_2 Concentration ($\mu g/m^3$)

56
52
48
44
40
36

Title

Figure 7 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$) Second Floor

Project

Air Quality Assessment
Mason Street, Manchester

Project Reference

1905

Client

Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental

www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Annual Mean PM_{10} Concentration ($\mu g/m^3$)

21

20

19

Title

Figure 8 - Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$) First Floor

Project

Air Quality Assessment
Mason Street, Manchester

Project Reference

1905

Client

Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental

www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)

14.5
14
13.5
13

Title

Figure 9 - Predicted Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)
First Floor

Project

Air Quality Assessment
Mason Street, Manchester

Project Reference

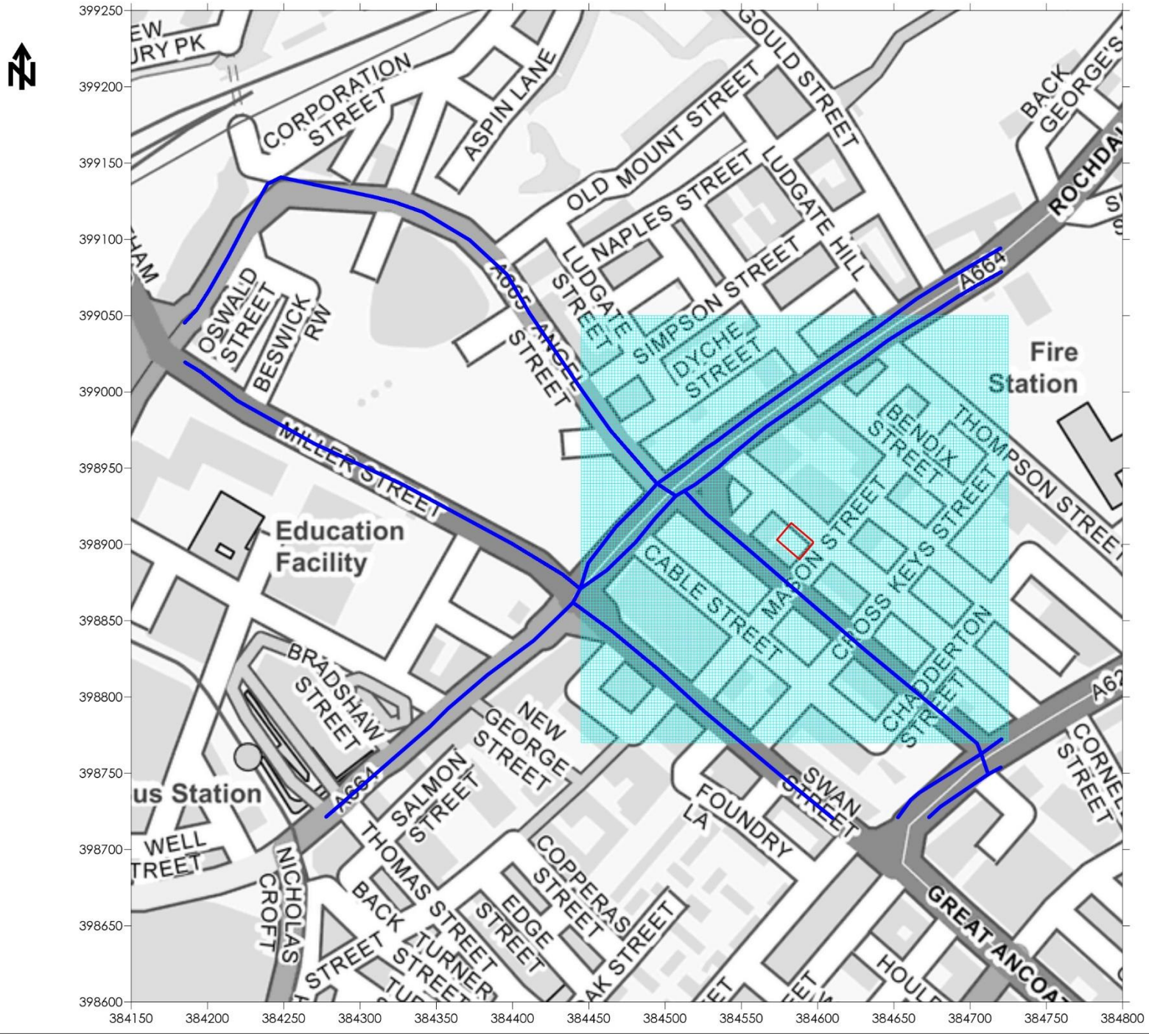
1905

Client

Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental
www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Road Link

Output Grid

Title
Figure 10 - ADMS-Roads Inputs

Project
Air Quality Assessment
Mason Street, Manchester

Project Reference
1905

Client
Linson Construction Pension Fund

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2016

Redmore environmental
www.red-env.co.uk | 0161 7060075

Appendix 1 - Assessment Input Data

Introduction

The proposal has the potential to expose future residents to elevated pollution levels. In order to assess NO_2, PM_{10} and $PM_{2.5}$ concentrations across the development site, dispersion modelling was undertaken in accordance with the following methodology. Modelling was undertaken for 2016 to allow verification against recent monitoring results and 2019 to represent likely conditions in the opening year of the scheme.

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.

These are detailed in the following Sections.

Assessment Area

The assessment area was defined based on the location of the development and roads likely to impact pollutant levels across the site. Ambient concentrations were predicted over NGR: 384445, 398770 to 384725, 399050 at the following heights:

- 1.50m;
- 4.95m; and,
- 6.20m.

The above heights were selected to represent the ground, first and second floor of the development. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

It should be noted that although the grid only covered the proposed development site, source geometries were extended in order to ensure the impact of all relevant emissions in the vicinity of the scheme were considered.

Reference should be made to Figure 10 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Traffic data for use in the assessment, including 24-hour AADT flows and fleet composition as HDV proportion, was obtained from the Department for Transport (DfT)[27]. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network in Great Britain for the years 1999 to 2016. It should be noted that the DfT web tool is referenced in DEFRA guidance[28] 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.

Traffic data for Angel Street was not available from the DfT and was therefore obtained from the Air Quality Chapter[29] of the Environmental Statement produced in support of the NOMA Plot L,

27 http://www.dft.gov.uk/traffic-counts/.

28 Local Air Quality Management (TG16), DEFRA, 2016.

29 Chapter 12 - Air Quality, Noma Plot L, Manchester, Environmental Statement, Volume 1, Deloitte, 2014.

Manchester, development. As this was based on traffic counts undertaken by Fore Consulting, the Transport Consultants for the project, and planning permission was granted for the site, it is considered to be a reliable data source for the assessment.

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

Road widths were estimated from aerial photography and UK highway design standards. A summary of the traffic data used in the assessment is provided in Table A1.1.

Table A1.1 Traffic Data

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		2016	2019			
L1	Shudehill	9,090	9,618	16.06	9.4	40
L2	Miller Street, Approach to Corporation Street, Slow Phase	15,885	16,808	2.22	10.6	20
L3	Miller Street	15,885	16,808	2.22	7.6	40
L4	Miller Street, Approach to Rochdale Road, Slow Phase	15,885	16,808	2.22	8.0	20
L5	Oldham Road, Eastbound (EB)	14,595	15,442	6.58	8.0	40
L6	Shudehill, Slow Phase (SP)	9,090	9,618	16.06	15.0	20
L7	Swan Street, SP	16,723	17,695	5.36	13.2	20
L8	Angel Street, SP	14,707	15,562	3.40	14.4	20
L9	Angel Street, West of Traffic Lights	14,707	15,562	3.40	9.1	30
L10	Angel Street Traffic Lights	14,707	15,562	3.40	9.2	15
L11	Angel Street, East of Traffic Lights	14,707	15,562	3.40	9.1	30
L12	Angel Street, Approach to Rochdale Road, SP	14,707	15,562	3.40	12.3	15
L13	Rochdale Road Northbound (NB), South of Angel Street	10,713	11,335	9.03	11.4	20
L14	Rochdale Road NB, North of Angel Street	7,486	7,921	7.84	7.4	40

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		2016	2019			
L15	Rochdale Road Southbound (SB), North of Angel Street	7,486	7,921	7.84	10.9	20
L16	Rochdale Road SB, South of Angel Street	10,713	11,335	9.03	10.5	20
L17	Addington Street, SP	12,732	13,472	2.79	9.7	20
L18	Rochdale Road Northbound, South of Thompson Street	7,486	7,921	7.84	7.4	20
L19	Rochdale Road SB, South of Thompson Street	7,486	7,921	7.84	7.1	40
L20	Angel Street Canyon 1	14,707	15,562	3.40	11.3	15
L21	Angel Street	14,707	15,562	3.40	11.3	30
L22	Angel Street Canyon 2	14,707	15,562	3.40	11.3	30
L23	Swan Street	16,723	17,695	5.36	8.6	40
L24	Rochdale Road NB, North of Thompson Street	7,486	7,921	7.84	7.4	45
L25	Rochdale Road SB, North of Thompson Street, SP	7,486	7,921	7.84	7.4	20
L26	Rochdale Road SB, North of Thompson Street	7,486	7,921	7.84	6.7	45
L27	Oldham Road, Westbound	14,595	15,442	6.58	10.1	40

Reference should be made to Figure 10 for a graphical representation of the road link locations.

Street 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 A1.2. It should be noted that the "right" parameters of the canyons were purposely included at 0m in order to represent the one-sided nature of the building topography.

Table A1.2 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
L20	0	0	0	0	9.20	7.00	21.30	21.30
L22	0	0	0	0	9.65	19.00	58.20	58.20

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 7.0). This has been produced by DEFRA and incorporates updated COPERT4v11 vehicle emission factors and fleet information.

There is current uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2016 emission factors were utilised in preference to the development opening

year in order to provide robust model outputs. As predictions for 2016 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 2016 to 31st December 2016 (inclusive). Manchester Airport is located at NGR: 381792, 384116, which is approximately 15.1km south-west of the development site. 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 1m 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 'cities, woodlands'.

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 flat land use, such as runways and surrounding grassland, and is suggested within ADMS-Roads as being suitable for 'agricultural areas (min)'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. 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

Background concentrations provided by DEFRA for the grid square containing the site, as shown in Table 12, were used in the assessment to represent existing pollutant levels across the modelling extents.

Similarly to emission factors, background concentrations from 2016 were utilised in preference to the development opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 5.1) provided by DEFRA, which is the method detailed within DEFRA guidance[30].

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 2016 using traffic data, meteorological data and monitoring results from this year.

30 Local Air Quality Management (TG16), DEFRA, 2016.

Diffusion tube monitoring of NO_2 concentrations was undertaken at one location within the modelling extents during 2016. The result was obtained and the road contribution to total NO_x concentration calculated following the methodology contained within DEFRA guidance[31]. The monitored annual mean NO_2 concentration and calculated road NO_x concentration is summarised in Table A1.3.

Table A1.3 Verification - Monitoring Result

Monitoring Location		Monitored NO_2 Concentration ($\mu g/m^3$)	Calculated Road NO_x Concentration ($\mu g/m^3$)
85	Angel Street, City Centre	51.22	40.70

The annual mean road NO_x concentration predicted from the dispersion model and the 2016 road NO_x concentration calculated from the monitoring result are summarised in Table A1.4.

Table A1.4 Verification - Modelling Result

Monitoring Location		Calculated Road NO_x Concentration ($\mu g/m^3$)	Modelled Road NO_x Concentration ($\mu g/m^3$)
85	Angel Street, City Centre	40.70	23.88

The monitored and modelled road NO_x concentrations were compared to calculate the associated ratio. This indicated a verification factor of 1.7042 was required to be applied to all modelling results.

Monitoring of PM_{10} and $PM_{2.5}$ concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM_{10} and $PM_{2.5}$ model predictions in lieu of more accurate data in accordance with DEFRA guidance[32].

31 Local Air Quality Management Technical Guidance (TG16), DEFRA, 2016.

32 Local Air Quality Management (TG16), DEFRA, 2016.

Appendix 2 - Curricula Vitae

JETHRO REDMORE

Director

BEng (Hons), MSc, MIAQM, MIEnvSc, PIEMA, CEnv

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.

ELEN OWEN

Senior Air Quality Consultant

BSc (Hons), AIEMA

Tel: 0161 706 0075 | Email: eowen@red-env.co.uk

KEY EXPERIENCE:

Elen 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.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Definition of baseline air quality and identification of sensitive areas across the UK.
- ADMS-5 modelling of industrial sources including Anaerobic Digestion (AD) plants to determine impacts of stack emissions on local air quality.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.

SELECT PROJECTS SUMMARY:

Potion Redevelopment, Erith

Air Quality Assessment of a residential development in an Air Quality Management Area (AQMA). Concerns were raised regarding the exposure of future occupants to poor air quality. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM_{10} and NO_2 concentrations across the site. Results revealed that pollution levels were below the air quality standards across the development.

Magdalen Street, Colchester

Air Quality Assessment in support of a planning application for a cluster of student accommodation buildings. The site was located in a built up area of Colchester and was already occupied by a bus depot. The assessment included a comparison of concentrations at sensitive receptors in areas where the urban topography would be altered as a result of the development. Review of the results revealed that canyon effects would be reduced in the presence of the student accommodation, when compared to the existing land use. A detailed report was produced and the local authority accepted the air quality findings.

Greenbridge Road, Swindon

Air Quality Assessment for a mixed-use development in Swindon. The proposals involved demolition of a large building prior to construction. An assessment of fugitive dust emissions was undertaken and revealed that the use of good practice control measures would provide suitable mitigation for the impacts of the scheme.

Gonerby Moor Anaerobic Digestion Plant

Air Quality and Odour Assessments in support of an AD plant in Grantham. Combustion products from the combined heat and power unit have the potential to result in air quality impacts. Further to this, storage and transfer of biomass materials can lead to odour emissions from the site. ADMS-5 was used to model both odour and air quality impacts. Results revealed that emissions would not lead to exceedences of the relevant air quality standards across the site, and odour emissions remained below benchmark levels at all identified sensitive locations.

Coral Mill, Rochdale

Air Quality Assessment for a residential scheme partially located in an AQMA. Due to the size of the development, it was possible that traffic generation by future occupants travelling to and from the site may cause negative impacts on sensitive receptors nearby. NO_2 and PM_{10} concentrations were quantified at specific receptor points to ensure there would be no significant increases in pollutant levels. Results revealed negligible impacts at all locations.

Stone Street, Kent

Air Quality Assessment for redevelopment of existing buildings in Gravesend, Kent. Road layout changes had been proposed in the vicinity of the site, which would alter the routes used by road traffic and thereby influence the location of vehicle emissions. Modelling took account of the impact of the new road layout on concentrations at the development. Results revealed pollutant concentrations were below the relevant standards across the site.