Air Quality Assessment

Moseley Road, Manchester

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Prepared by	Pearl Hutchinson			
Position	Principal Air Quality Consultant			
Issued by	Jethro Redmore			
Position	Director			
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Taylor Road, Urmston, Manchester, M41 7JQ

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

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Executive Summary

Redmore Environmental Ltd was commissioned by Z and N Fareed Partnership to undertake an Air Quality Assessment in support of a planning application for a proposed residential development on land off Moseley Road, Manchester.

The development may lead to the exposure of future residents to elevated pollution levels, as well as adverse impacts at sensitive locations. As such, an Air Quality Assessment was undertaken 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 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.

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 using standard screening criteria. Due to the low number of vehicle trips anticipated to be produced by the proposals, road traffic exhaust emission impacts were not predicted to be significant.

There is the potential for the exposure of future residents 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 dispersion modelling assessment indicated that predicted pollution levels were below the relevant criteria at all locations across the development. The site is therefore considered suitable for the proposed end use from an air quality perspective.

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

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Z and N Fareed Partnership to undertake an Air Quality Assessment in support of a planning application for a proposed residential development on land off Moseley Road, Manchester.

1.1.2 The development may lead to the exposure of future residents to elevated pollutant concentrations, as well as adverse impacts at sensitive locations. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions at the site, consider its 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 on land off Moseley Road, Manchester, at approximate National Grid Reference (NGR): 386835, 394035. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise the conversion and a one-storey upward extension to an existing office building to provide 17 residential units and associated infrastructure.

1.2.3 The development is located adjacent to the junction of Moseley Road and Slade Lane. As such, there is the potential for exposure of future residents to elevated pollutant concentrations as result of emissions associated with queuing traffic in this area. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions and consider the suitability of the site for the proposed end use. Potential impacts associated with the scheme have also been considered using standard screening methodologies. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene; and,
- Carbon monoxide

2.1.2 Air Quality Target Values (AQTVs) were also provided for several additional pollutants.

2.1.3 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 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.

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

Table 1 Air Quality Objectives

Pollutant	Air Quality Objectives	
	Concentration (µg/m^3)	Averaging Period
NO_2	40	Annual mean

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

Pollutant	Air Quality Objectives	
	Concentration (µg/m³)	Averaging Period
	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

2.1.5 Table 2 presents the AQTV considered within this assessment.

Table 2 Air Quality Target Value

Pollutant	Air Quality Target Values	
	Concentration (µg/m³)	Averaging Period
$PM_{2.5}$	25	Annual mean

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

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

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

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
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

2.2 Local Air Quality Management

2.2.1 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.

2.3 Dust

2.3.1 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."

2.3.2 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). 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.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework[3] (NPPF) was published in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

2.4.2 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."

2.4.3 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 […]"

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

2.4.4 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."

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

2.5 National Planning Practice Guidance

2.5.1 The National Planning Practice Guidance[4] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making 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 considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

[4] https://www.gov.uk/guidance/air-quality--3.

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

2.6 Local Planning Policy

2.6.1 The Manchester Local Development Framework consists of a series of planning documents of which the Core Strategy[5] is central. This was adopted by Manchester City Council (MCC) on 11th July 2012 and provides policies which guide the determination of planning applications within the city.

2.6.2 A review of the Core Strategy indicated the following policies of relevance to the assessment:

> "Policy EN 16
>
> Air Quality
>
> 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."
>
> "Policy DM 1
>
> Development Management

[5] Core Strategy, MCC, 2012.

> All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-
>
> […]
>
> Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise."

2.6.3 The implications of the above policies were taken into consideration throughout the undertaking of the assessment.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposal 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, which was agreed with Lisa Jones, Environmental Protection Officer at MCC, on 17th March 2021.

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 two types to reflect their different potential impacts. These are:

- Construction; and,
- Trackout.

3.2.3 The proposals do not include demolition or earthworks. As such, these activities were not considered within the assessment.

3.2.4 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}.

3.2.5 The assessment steps are detailed below.

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

Step 1

3.2.6 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.

3.2.7 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2

3.2.8 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).

3.2.9 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

3.2.10 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	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

Magnitude	Activity	Criteria
Medium	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	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

3.2.11 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

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
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 parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.12 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.

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

3.2.14 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

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

3.2.15 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	Background 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
	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

Receptor Sensitivity	Background 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
	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

3.2.16 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

3.2.17 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 category from construction activities.

Table 9 Construction Dust - Dust Risk Category from Construction Activities

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

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
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**.

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

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 development has the potential to increase concentrations of NO_2, PM_{10} and $PM_{2.5}$ 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 IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[8] guidance to determine the potential for trips generated by the development to affect local air quality.

3.3.2 The following criteria are provided 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 Annual Average Daily Traffic (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.

3.3.3 Should these criteria not be met, then the IAQM guidance[9] considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

3.3.4 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

[8] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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

significance of predicted impacts can then be determined in accordance with the methodology outlined in the IAQM guidance[10].

Potential Future Exposure

3.3.5 The proposals have the potential to expose future occupants 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 undertaken. Reference should be made to Appendix 1 for a full description of the assessment input data.

3.3.6 The dispersion modelling results 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.

10 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 proposal were identified in order to provide a baseline for the 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 concentrations of NO_2 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 65m east 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 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 using continuous and periodic methods throughout their area of jurisdiction. Recent NO_2 results recorded in the vicinity of the development are shown in Table 11.

Table 11 Monitoring Results

Monitoring Site		Monitored NO_2 Concentration (µg/m³)		
		2017	2018	2019
MA80NO	Alma Road	34.2	32.2	33.2
MA81NO	Peaceville Road	25.2	21.8	23.1

4.3.2 As shown in Table 11, annual mean NO_2 concentrations were below the AQO of 40µg/m³ at both monitors during recent years. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 MCC does not undertake $PM_{2.5}$ or PM_{10} monitoring within the vicinity of the development.

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: 386500, 394500. Data for this location was downloaded from the DEFRA website[11] 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)		
	2019	2021	2023
NO_2	17.95	16.49	15.42
PM_{10}	12.74	12.34	12.12
$PM_{2.5}$	8.65	8.40	8.24

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.

[11] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.

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 construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 13.

Table 13 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	-
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 route. These are summarised in Table 14.

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 development boundary or the access route within 500m of the site entrance. 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 to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	A review of the planning portal and Google Maps imagery identified an apartment block (planning reference: 117274/FO/2017) approximately 135m west of the site is currently undergoing construction. It is therefore possible that there may have been dust generation in the area over recent months
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal did not indicate any additional development proposals likely to result in concurrent dust generation in the vicinity of the site
Pre-existing screening between the source and the receptors	There is no significant screening around the 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 unlikely 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.

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 to Potential Dust Impacts

Potential Impact	Sensitivity of the Surrounding Area	
	Construction	Trackout
Dust Soiling	High	High

Potential Impact	Sensitivity of the Surrounding Area	
	Construction	Trackout
Human Health	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 proposal. There is also the potential for the exposure of future occupants to any existing air quality issues. These factors are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

5.2.1 The undertaking of activities such as cutting construction 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

Construction

5.2.4 The total volume of the proposed extension 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**.

5.2.5 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 9, the scheme is considered to be a **low** risk site for dust soiling as a result of construction 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 construction activities.

Trackout

5.2.7 Based on the 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**.

5.2.8 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.

5.2.9 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

5.2.10 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	
	Construction	Trackout
Dust Soiling	Low	Low
Human Health	Negligible	Negligible

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

5.2.12 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

5.2.13 The IAQM guidance[12] 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 or similar if required by the LA.

Table 18 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
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, 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 • Avoid site runoff of water or mud • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used

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

Issue	Control Measure
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
Waste management	• No bonfires or burning of waste materials
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

Step 4

5.2.14 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 the IAQM guidance[13].

5.3 Operational Phase Assessment

Potential Development Impacts

5.3.1 Any vehicle movements associated with the proposals will generate exhaust emissions on the local and regional road networks. Review of the Transport Statement[14] produced by

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

[14] Proposed Residential Development, Moseley Road, Manchester - Transport Statement, SCP, 2021.

SCP indicated that the proposals are predicted to generate a maximum of 41 daily vehicle movements.

5.3.2 Based on the provided information, the proposals are not predicted 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 **not significant**, in accordance with the IAQM[15] screening criteria shown in Section 3.3.

Potential Future Exposure

5.3.3 The proposed development has the potential to expose 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 4 to 6 for graphical representations of predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations.

5.3.4 As shown in Figure 4, annual mean NO_2 concentrations were predicted to be below the AQO of 40µg/m^3 at all locations across the development. The maximum level at the site boundary was 29.84µg/m^3. As such, future residents are not predicted to be exposed to NO_2 concentrations above the AQO.

5.3.5 As shown in Figure 5, annual mean PM_{10} concentrations were predicted to be below the AQO of 40µg/m^3 at all locations across the development. The maximum level at the site boundary was 14.65µg/m^3. As such, future residents are not predicted to be exposed to PM_{10} concentrations above the AQO.

5.3.6 As shown in Figure 6, annual mean $PM_{2.5}$ concentrations were predicted to be below the AQTV of 25µg/m^3 at all locations across the development. The maximum level at the site boundary was 9.78µg/m^3. As such, future residents are not predicted to be exposed to $PM_{2.5}$ concentrations above the AQTV.

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

5.3.7 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the relevant AQOs and AQTV. As such, the site is considered suitable for the proposed end use from an air quality perspective.

Mitigation

5.3.8 A number of mitigation measures have been included within the development 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 19 describes the good practice principles detailed in the IAQM guidance along with how each has been addressed with regards to the proposals.

Table 19 Good Practice Design Principles

Issue	Control Measure	Action
Design Phase	New developments should not contravene the Council's Air Quality Action Plan, or render the measures unworkable	It is confirmed that the proposed development 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 include the redevelopment of the existing building. As such, the scheme will not create a new 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 Levenshulme Railway Station
	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 chimney stacks	As shown previously, exposure of future occupants to exceedences of the relevant AQOs and AQTVs was not predicted

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

Issue	Control Measure	Action
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 proposals are for 17 residential units. As such, two EV charging points will be provided It should be noted that the development includes 15 car parking spaces, which is less than the one space per residential unit, thus discouraging car ownership
	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	As shown previously, the development is not predicted to generate significant levels of additional traffic. However, a Travel Plan can be submitted in support of the proposals if 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/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

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

6.0 CONCLUSION

6.1.1 Redmore Environmental Ltd was commissioned by Z and N Fareed Partnership to undertake an Air Quality Assessment in support of a planning application for a proposed residential development on land off Moseley Road, Manchester.

6.1.2 The development may lead to the exposure of future residents to elevated pollution levels, as well as adverse impacts at sensitive locations. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions at the site, consider its suitability for the proposed end use and assess potential impacts associated with the scheme.

6.1.3 During the construction phase of the proposal there is the potential for air quality impacts as a result of fugitive dust emissions from the development. 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 construction and trackout activities was predicted to be **not significant**.

6.1.4 Potential impacts during the operational phase of the proposal may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the screening criteria provided within the IAQM[17] guidance. Due to the low number of anticipated vehicle trips associated with the proposals, road traffic exhaust impacts were predicted to be **not significant**.

6.1.5 The proposal has 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.

6.1.6 The results of the dispersion modelling assessment indicated that predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations were below the relevant AQOs and AQTV at all locations across the development. The site is therefore considered suitable for the proposed end use from an air quality perspective.

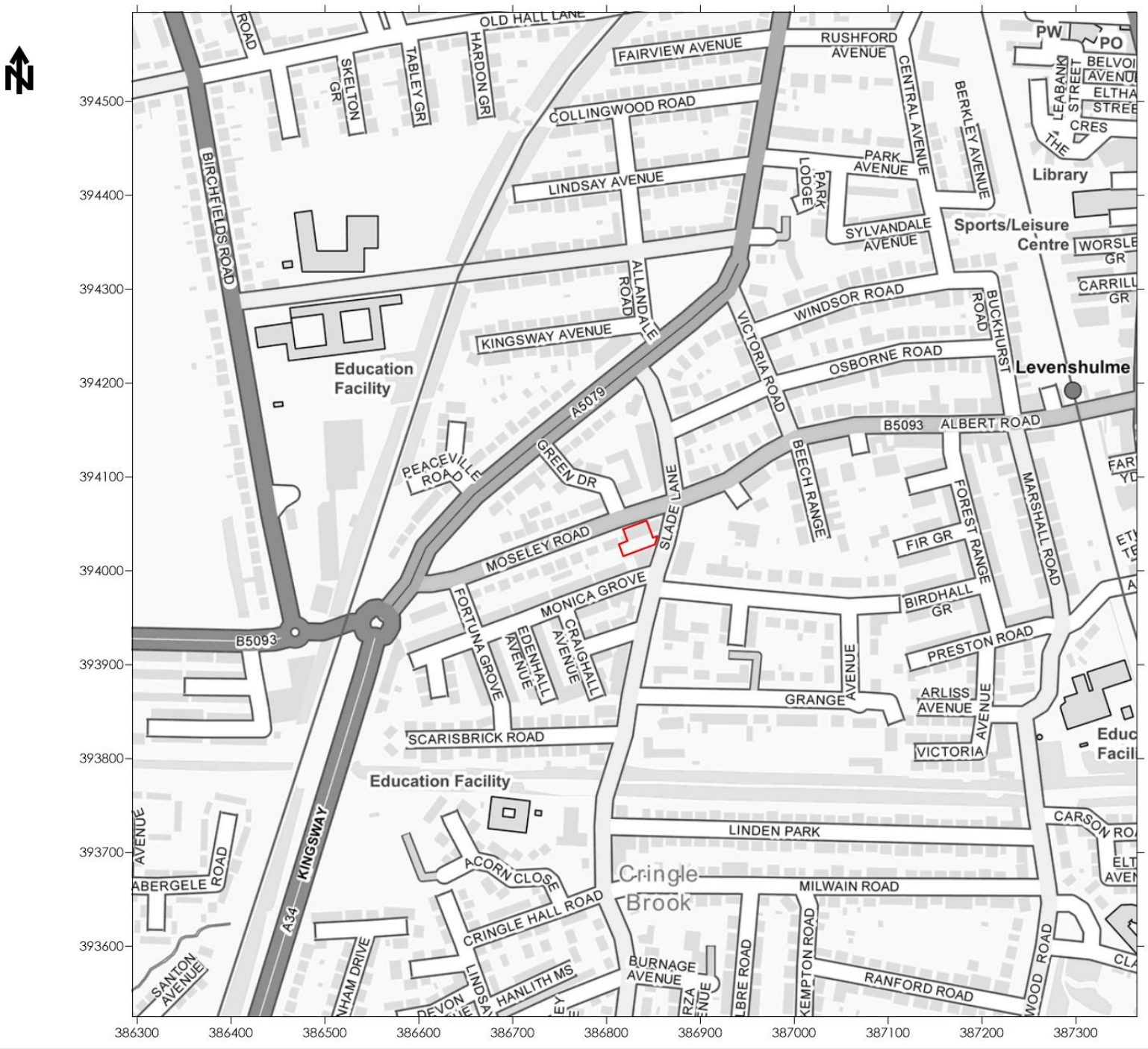
[17] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.1.7 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
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
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
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

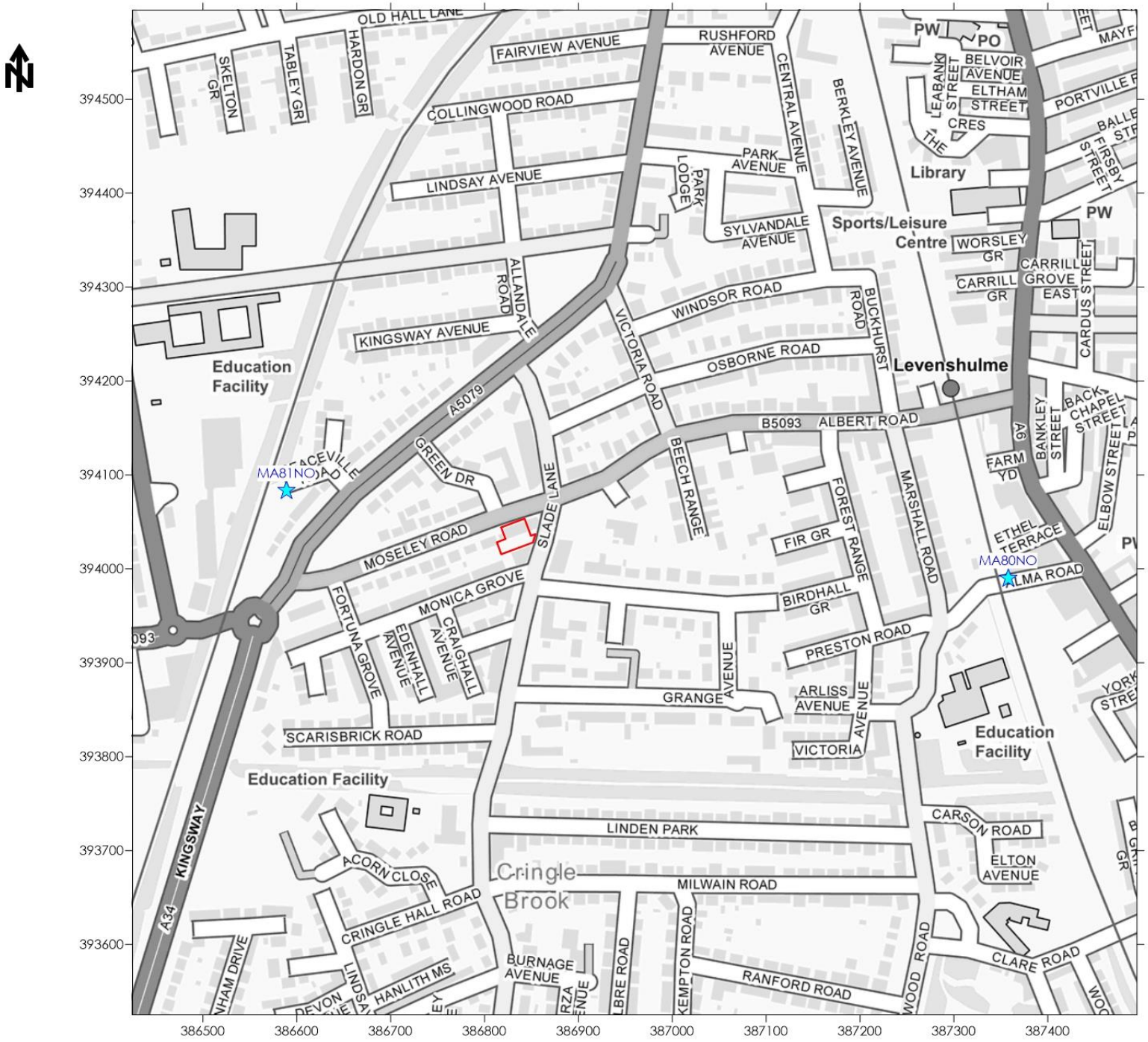
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Moseley Road, Manchester

Project Reference
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Legend

Site Boundary

Monitor

Title
Figure 2 - Monitoring Locations

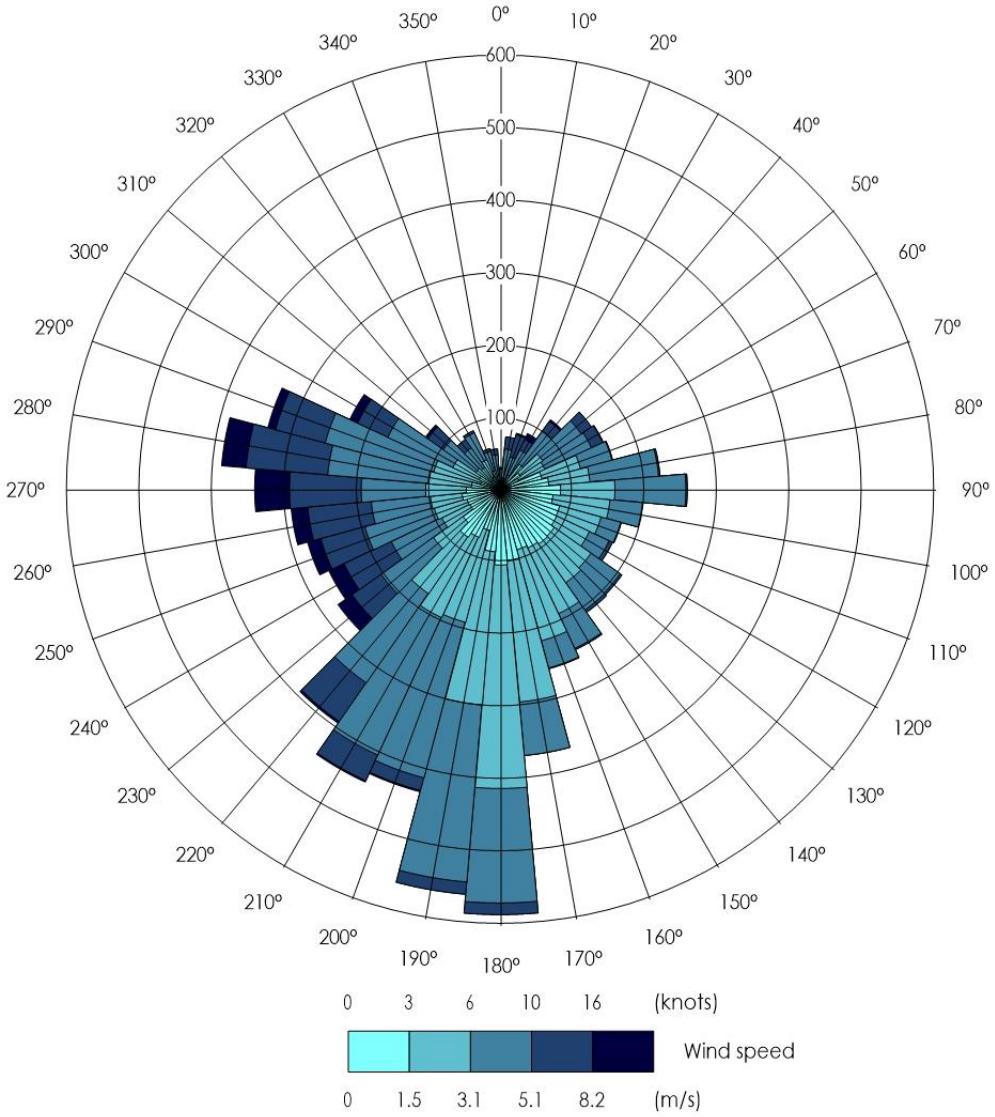
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Figure 3 - Wind Rose of 2019 Manchester Airport Meteorological Data

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Legend

Site Boundary

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

56
52
48
44
40
36
32
28
24

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

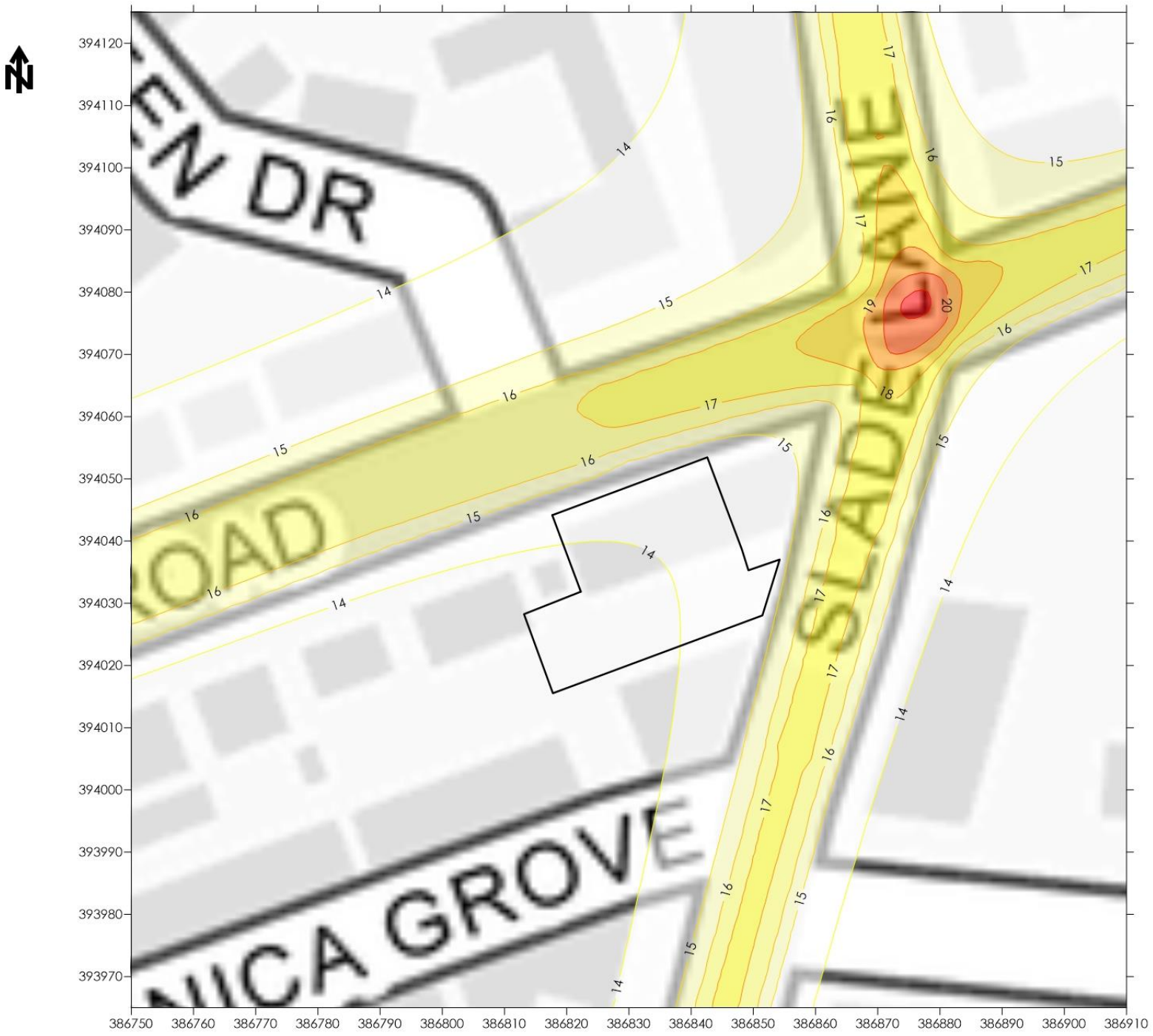
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Site Boundary

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

21
20
19
18
17
16
15
14

Title
Figure 5 - Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

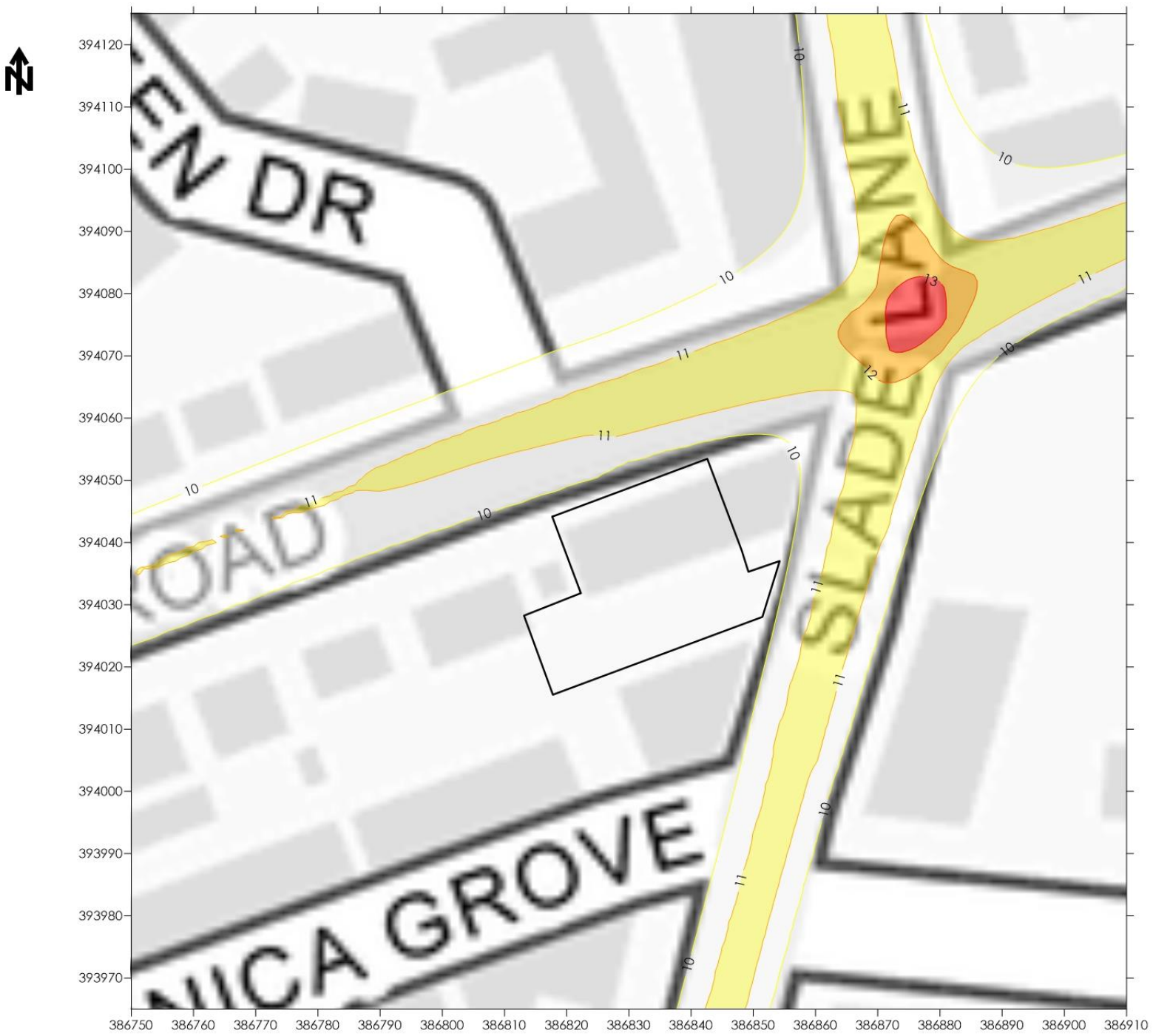
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Legend

Site Boundary

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

13
12
11
10

Title
Figure 6 - Predicted Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)

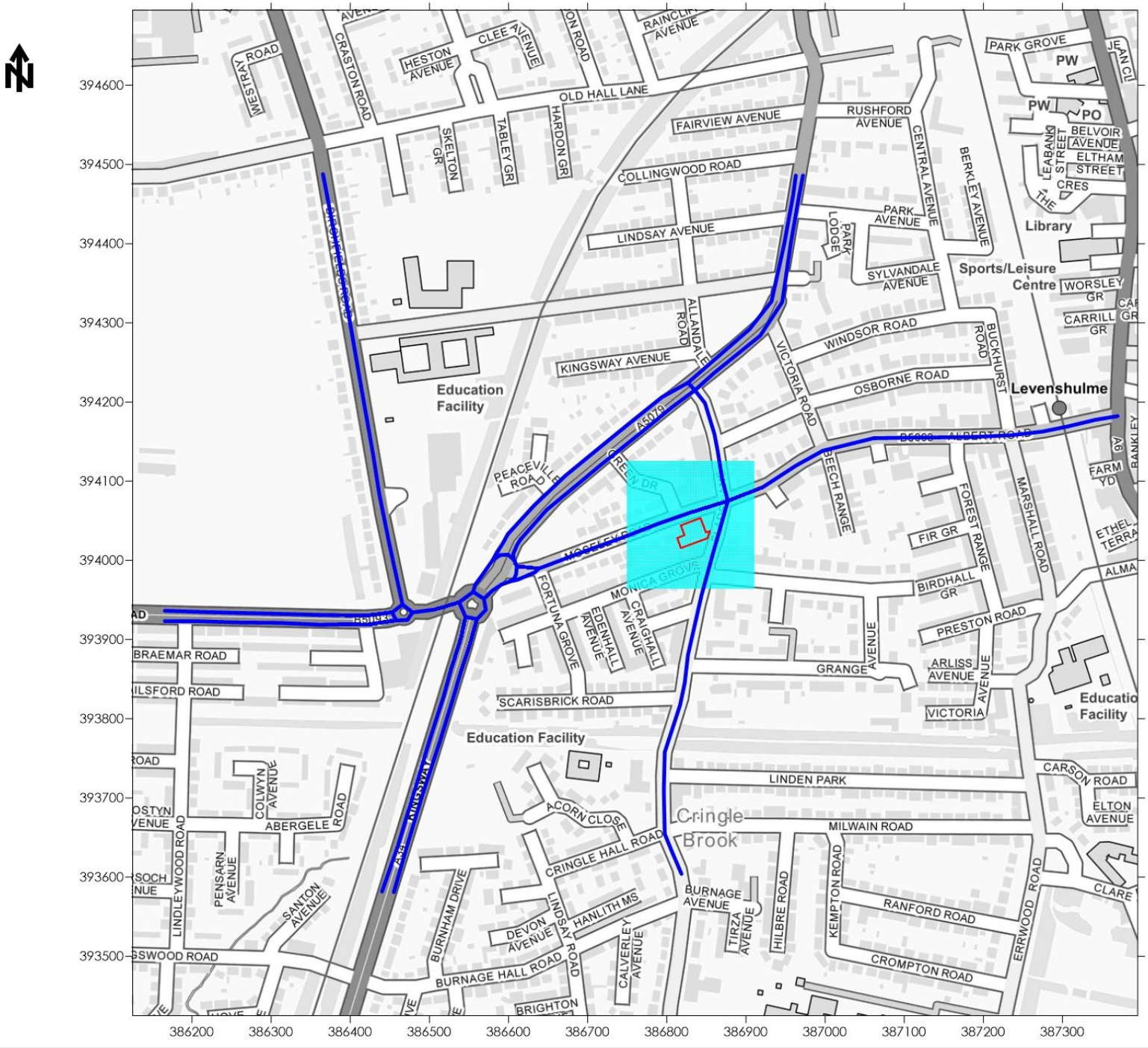
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Legend

Site Boundary

Output Grid

Road Link

Title
Figure 7 - ADMS-Roads Inputs

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Appendix 1 - Assessment Input Data

Introduction

The proposals have 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 2019 to allow verification against recent monitoring results and 2023 to represent likely conditions in the opening year of the scheme.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.0.1). 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.

The relevant inputs 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:

386750, 393965 to 386910, 394125. 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 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 7 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Baseline 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)[18]. 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 2019. It should be noted that the DfT web tool is referenced in DEFRA guidance[19] 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.

The 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.

Road widths and vehicle speeds 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)
		2019	2023			
L1	Birchfields Road, North of Moseley Road	11,873	12,664	2.75	10.6	45

[18] https://roadtraffic.dft.gov.uk/#16/53.4808/-2.2426/basemap-countpoints.

[19] Local Air Quality Management (TG16) Technical Guidance, DEFRA, 2018.

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		2019	2023			
L2	Birchfields Road, North of Moseley Road, Slow Phase (SP)	11,873	12,664	2.75	9.7	35
L3	B5903 Moseley Road, Eastbound (EB)	6,365	6,789	1.67	6.4	50
L4	B5903 Moseley Road EB, West of Birchfields Road, SP	6,365	6,789	1.67	5.8	25
L5	B5903 Moseley Road, Westbound (WB), West of Birchfields Road	6,912	7,372	1.78	5.0	50
L6	B5903 Moseley Road WB, West of Birchfields Road, SP	6,912	7,372	1.78	5.3	30
L7	A34 Northbound (NB), South of Moseley Road	12,377	13,201	2.09	9.3	65
L8	A34 NB, South of Moseley Road, SP	12,377	13,201	2.09	12.8	35
L9	A34 Southbound (SB), South of Moseley Road	11,854	12,643	2.45	8.4	65
L10	A34 SB, South of Moseley Road, SP	11,854	12,643	2.45	8.1	40
L11	B5903 Albert Road WB	10,130	10,805	2.91	6.6	45
L12	B5903 Albert Road WB, approaching the intersection with Slade Lane	10,130	10,805	2.91	12.2	40
L13	Moseley Road WB, between Slade Lane and A5079/A34	10,130	10,805	2.91	15.3	45
L14	Moseley Road, south-west joining A5079, SP	5,065	5,402	2.91	6.8	30
L15	A5079 Kingsway, approaching A34 Roundabout, SP	5,065	5,402	2.91	9.5	25
L16	A5079 Kingsway SB	6,055	6,458	1.82	6.2	45
L17	A5079 Kingsway NB	5,054	5,391	2.26	10.6	45
L18	A5079 Kingsway NB, SP	5,054	5,391	2.26	9.2	30
L19	B5903 Moseley Road WB, from A34 Roundabout approaching Birchfields Road	13,277	14,161	1.72	10.9	30
L20	B5903 Moseley Road WB, on approach to Roundabout, SP	13,277	14,161	1.72	12.0	25
L21	A5079 Kingsway to Moseley Road, SP	5,065	5,402	2.91	7.7	30
L22	Moseley Road WB to A34 Roundabout, SP	6,365	6,789	1.67	9.0	30

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		2019	2023			
L23	A5079 Kingsway SB, to the B5093, SP	6,055	6,458	1.82	6.1	15
L24	Slade Lane	9,393	10,018	3.05	9.5	35
L25	Slade Lane SP	9,393	10,018	3.05	10.2	25
R1	A34 Roundabout	9,525	10,160	2.18	6.4	20
R2	Mini Roundabout at the intersection of Birchfields Road	9,607	10,247	2.04	8.8	15

Reference should be made to Figure 7 for a graphical representation of the road link locations.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 10.1). This has been produced by DEFRA and incorporates updated COPERT 5.3 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, 2019 emission factors were utilised in preference to the development opening year in order to provide robust model outputs. As predictions for 2019 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 2019 to 31st December 2019 (inclusive). Manchester Airport is located at NGR: 381792, 384116, which is approximately 11.1km 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 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland and open suburbia'.

A z_0 of 0.2m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area 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 NO_2, PM_{10} and $PM_{2.5}$ concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 13.

Similar to emission factors, background concentrations from 2019 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 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance[20].

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

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 2019 using traffic data, meteorological data and monitoring results from this year.

MCC undertook monitoring of NO_2 concentrations at one location within the vicinity of roads included within the modelling extents during 2019. The result was obtained and the road contribution to total NO_x concentration calculated following the methodology contained within DEFRA guidance[21]. The monitored annual mean NO_2 concentration and calculated road NO_x concentration is summarised in Table A1.2.

Table A1.2 NO_x Verification - Monitoring Result

Monitoring Location		Monitored NO_2 Concentration ($\mu g/m^3$)	Calculated Road NO_x Concentration ($\mu g/m^3$)
MA81NO	Peaceville Road	23.1	9.80

The annual mean road NO_x concentration predicted from the dispersion model and the 2019 road NO_x concentration calculated from the monitoring result is summarised in Table A1.3.

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

Table A1.3 NO_x Verification - Modelling Result

Monitoring Location		Calculated Road NO_x Concentration (µg/m³)	Modelled Road NO_x Concentration (µg/m³)
MA81NO	Peaceville Road	9.80	4.79

The monitored and modelled road NO_x concentrations were compared to calculate the associated ratio. This indicated that a verification factor of 2.0442 was required to be applied to all road NO_x modelling results.

Monitoring of PM_{10} or $PM_{2.5}$ 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 the guidance provided within DEFRA guidance[22].

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

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.

PEARL HUTCHINSON

Principal Air Quality Consultant

BSc (Hons), MIAQM, AIEnvSc

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

KEY EXPERIENCE:

Pearl is a Principal Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with 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.
- Assessment of construction dust impacts from a range of development sizes.
- Assessment of fugitive dust impacts from a range of mineral extraction and industrial developments.
- 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.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.
- Odour monitoring at industrial sites to quantify odour emission rates.

SELECT PROJECTS SUMMARY:

Industrial and Agricultural

Discovery Park, Sandwich - Air Quality Assessment including dispersion modelling of gas fired steam generating boilers in support of a Medium Combustion Plant (MCP) Environmental Permit Application.

St Thomas House, Ellesmere Port - Air Quality Assessment including dispersion modelling of two biomass boilers firing wood pellets.

Herriard Anaerobic Digester - H1 Screening Assessment in accordance with Environment Agency guidance.

Halls Farm, Bude - Ammonia and Odour Assessments in support of a proposed farm expansion, including the construction of a cattle slurry lagoon and livestock housing

London Luton Airport - Air Quality Assessment including dispersion modelling of gas fired boilers in support of a MCP Environmental Permit Application.

Rectory Farm, Aldborough - Odour Assessment in support of the development of livestock housing.

Ashfields, Tilbury - Dust Assessment in support of the extraction of Pulverised Fuel Ash associated with the former Tilbury Power Station.

Poplar Farm, Bedfield - Dust Assessment and Management Plan for an aggregate processing facility.

Crown Chicken, Kenninghall - Air Quality, Odour and Dust Environmental Impact Assessment (EIA) in support of a farm expansion.

Newport Chalk Pit - Air Quality Assessment in support of a recycling and restoration project.

Residential

Jack Chase Way, Caister - Air Quality EIA in support of a planning application for circa 725 dwellings.

New Road, Tintwistle - Odour Assessment including dispersion modelling of the Tintwistle Sewage Treatment Works in order to determine suitability of adjacent land for residential use

St Nicholas Circle, Leicester - Air Quality Assessment including dispersion modelling of road traffic sources to determine suitability of the site for student accommodation.

Land East and West of A140, Long Stratton - Air Quality EIA for a large scale residential development.

Meadley Square, Knaresborough - Odour Assessment including site surveys and a risk assessment to determine potential for loss of amenity to future occupants due to adverse odours generated by an adjacent takeaway.

Main Street, Port Rush - Kitchen Odour Impact Assessment in support of a proposed restaurant with residential apartments above

Commercial and Retail

Downtown Grantham Designer Outlet - Air Quality EIA in support the development of a retail outlet

North Acton Road, London - Air Quality Assessment in support of the development of a seven storey building to include a café and commercial floor space.

Great Homer Street, Liverpool - Investigative Odour Survey at an existing McDonalds restaurant.

Ashdown Business Park, Kent - Air Quality Assessment in support of a Premier Inn Hotel and Drive-Thru Costa Coffee.

Sandbrook Park, Rochdale - Air Quality Assessment in support of 14 business/industrial units.