

Air Quality Assessment
Castle Sidings, Rochdale

Client: Kellen Homes Limited

Reference: 6299r6

Date: 19th April 2024



Report Issue

Report Title: Air Quality Assessment - Castle Sidings, Rochdale

Report Reference: 6299

Field	Report Version					
	1	2	3	4	5	6
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Date of Issue	31 st January 2023	7 th March 2023	14 th April 2023	3 rd November 2023	4 th December 2023	19 th April 2024
Comment	Draft for comment	Updated site layout	Updated site layout	Updated site layout	Text amendments	Updated site layout

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Executive Summary

Redmore Environmental Ltd was commissioned by Kellen Homes Limited to undertake an Air Quality Assessment in support of a residential development on land at Castle Sidings, Rochdale.

The development may lead to adverse air quality effects at sensitive locations during the construction and operational phases. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions 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 a development of this size and nature and reduce potential impacts to an acceptable level.

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

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

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

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	Legislation	2
2.2	Local Air Quality Management	4
2.3	Dust	4
2.4	National Planning Policy	5
2.5	National Planning Practice Guidance	6
2.6	Local Planning Policy	7
3.0	METHODOLOGY	10
3.1	Introduction	10
3.2	Construction Phase Assessment	10
	Step 1	11
	Step 2	11
	Step 3	16
	Step 4	17
3.3	Operational Phase Assessment	17
4.0	BASELINE	20
4.1	Introduction	20
4.2	Local Air Quality Management	20
4.3	Air Quality Monitoring	20
4.4	Background Pollutant Concentrations	21
4.5	Sensitive Receptors	22
	Construction Phase Sensitive Receptors	22
	Operational Phase Sensitive Receptors	24
5.0	ASSESSMENT	27
5.1	Introduction	27
5.2	Construction Phase Assessment	27
	Step 1	27
	Step 2	27
	Step 3	29
	Step 4	31
5.3	Operational Phase Assessment	32

Predicted Concentrations	32
Predicted Impacts	37
Overall Impact Significance	42
6.0 CONCLUSION	44
7.0 ABBREVIATIONS	45

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 Kellen Homes Limited to undertake an Air Quality Assessment in support of a residential development on land at Castle Sidings, Rochdale.

1.1.2 The development may lead to adverse air quality effects at sensitive locations during the construction and operational phases. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential impacts as a result of the scheme.

1.2 Site Location and Context

1.2.1 The site is located on land at Castle Sidings, Rochdale, at approximate National Grid Reference (NGR): 387942, 410156. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise a full planning application for residential development, including access, car parking, landscaping, open space and associated engineering and infrastructure including an electric substation and foul water pump station.

1.2.3 The proposals have the potential to cause air quality impacts at sensitive locations. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the site during the operational phase. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions and consider potential effects as a result of the proposals. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO₂);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- 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 were also provided for several additional pollutants. It should be noted that the AQLV for PM_{2.5} stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023¹. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These 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 The Environmental Improvement Plan 2023² was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to PM_{2.5}. The concentration target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

¹ AQS: Framework for Local Authority Delivery, DEFRA, 2023.

² Environmental Improvement Plan 2023, DEFRA, 2023.

2.1.5 Table 1 presents the AQOs, AQLVs and Interim Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/Air Quality Limit Values/Interim Target

Pollutant	Air Quality Objective/Air Quality Limit Value/Interim Target	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
PM _{2.5}	20	Annual mean
	12 ^(a)	Annual mean

Note: (a) Interim Target to be achieved by end of January 2028.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance³ on where the AQOs for pollutants considered within this report apply.

Table 2 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

³ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
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

2.2 Local Air Quality Management

- 2.2.1 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 2, 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, 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 practicable means.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework⁴ (NPPF) was published in September 2023 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 protect and enhance our natural, built and historic environment; including making effective use of land, improving 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

⁴ NPPF, Ministry of Housing, Communities and Local Government, 2023.

soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality [...]."

- 2.4.4 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 Guidance⁵ (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?

⁵ <https://www.gov.uk/guidance/air-quality--3>.

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?

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 Core Strategy 2016 - 2028⁶ is a key document in the Rochdale Local Plan and was adopted by Rochdale Borough Council (RBC) in October 2016. It sets out the strategic planning framework for the borough's future development needs up to 2028.

2.6.2 Review of the document indicated the following policies of relevance to the assessment:

"Policy G9 - Reducing the Impact of Pollution, Contamination and Land Instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

- a) Focusing on measures that reduce air pollution in Air Quality Management Areas, and other areas where pollution levels are unacceptable, particularly around motorways and main roads;
- b) Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;
- c) Ensuring sensitive new developments such as housing, schools and hospitals are not adversely affected by existing sources of pollution such as roads and certain types of industry;
- d) Requiring a Low Emissions Strategy (LES) where development requires a Transport Assessment, and in other circumstances as appropriate;

[...]

⁶ Core Strategy 2016 - 2028, RBC, 2016.

g) Using planning conditions or obligations to control pollution from new development, or the impact of pollution on new development."

"Policy DM1 - General Development Requirements

All development proposals, including changes of use of land and buildings, extensions and alterations, will be expected to demonstrate that they:

[...]

d. Mitigate against any impacts due to noise, air, dust, light and odour pollution, traffic generation or inadequate access, where such mitigation is identified as being necessary;

[...]

f. Do not have an adverse impact on health, through its impact or the effect of existing problems e.g. land contamination, or poor air quality;

[...]."

"DM2 - Delivering Planning Contributions and Infrastructure

1. General approach

[...]

3. All types of development

For all types of development, including housing, we will seek contributions for any infrastructure or other measures necessary to mitigate any on site or off-site impacts from the development.

These contributions may cover, dependent on need:

[...]

Mitigation or compensation against environmental impacts e.g. noise, air quality (particularly in Air Quality Management Areas);

[...]."

"Policy C6 - Improving Health and Well Being

[...]

- i) Identifying and implementing measures to reduce traffic movements and congestion to reduce air and noise pollution [...]."

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

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases. These have been assessed in accordance with the following methodology.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V2.1'⁷.

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

- Earthworks;
- Construction; and,
- Trackout.

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

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

3.2.4 The assessment steps are detailed below.

⁷ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

Step 1

- 3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m from the boundary or 50m from the construction vehicle route up to 250m 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 250m 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 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Earthworks	• Total site area greater than 110,000m² • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 6m in height

Magnitude	Activity	Criteria
	Construction	- Total building volume greater than 75,000m³ - On site concrete batching - Sandblasting
	Trackout	- More than 50 Heavy Duty Vehicle (HDV) trips per day - Potentially dusty surface material (e.g. high clay content) - Unpaved road length greater than 100m
Medium	Earthworks	- Total site area 18,000m² to 110,000m² - Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time - Formation of bunds 3m to 6m in height
	Construction	- Total building volume 12,000m³ to 75,000m³ - Potentially dusty construction material (e.g. concrete) - On site concrete batching
	Trackout	20 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 18,000m² - 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
	Construction	- Total building volume less than 12,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	- Less than 20 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 development to potential dust impacts. The influencing factors are shown in Table 4.

Table 4 Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM₁₀. e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	• Nationally designated site e.g. Sites of Special Scientific Interest
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, farmland, short term car parks 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 5.

Table 5 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	Low	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 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 6 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

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
	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
			1 - 10	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Low	-	1 or more	Low	Low	Low	Low

3.2.15 Table 7 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 7 Construction Dust - Sensitivity of the Area to Ecological Impacts

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

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
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 8 outlines the risk category from earthworks and construction activities.

Table 8 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 9 outlines the risk category from trackout activities.

Table 9 Construction Dust - Dust Risk Category from Trackout Activities

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

Step 3

3.2.19 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance⁸ to reduce potential dust impacts based upon the relevant risk categories

⁸ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

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

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

- 2019 - Verification;
- Assessment year Do-Minimum (DM) (predicted traffic flows in 2025 should the proposals not proceed); and,
- Assessment year Do-Something (DS) (predicted traffic flows in 2025 should the proposals be completed).

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

3.3.3 Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with the guidance

provided within the Design Manual for Roads and Bridges (DMRB)⁹ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance¹⁰ on where the AQOs apply, as summarised in Table 2, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the development.

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

Table 10 Significance of Road Vehicle Exhaust Emission Impacts

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

- 3.3.5 The matrix shown in Table 10 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

- 3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document¹² provides guidance on determining the overall air quality impact significance of the

⁹ LA 105: Air Quality, Highways England, 2019.

¹⁰ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

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

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

operation of a development. The following factors are identified for consideration by the assessor:

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

3.3.7 The IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

3.3.8 The determination of significance relies on professional judgement and reasoning has been provided as far as practicable. The IAQM guidance¹³ suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

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

4.0 BASELINE

4.1 Introduction

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

4.2 Local Air Quality Management

- 4.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), RBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO within the borough. As such, a number of roads within Rochdale 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 Rochdale Council area."

- 4.2.2 The development is located approximately 280m west 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 therefore been considered throughout the assessment.
- 4.2.3 RBC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMA's have been designated.

4.3 Air Quality Monitoring

- 4.3.1 Monitoring of pollutant concentrations is undertaken by RBC throughout their area of jurisdiction. Recent NO₂ results recorded in the vicinity of the development are shown in Table 11. Exceedences of the relevant AQO are shown in **bold**.

Table 11 Monitoring Results

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)		
		2018	2019	2020
RO2ANO	Trows Lane, Castleton	28.9	32.7	21.7
RO3ANO	52 Cherrington Drive, Castleton	20.6	22.1	16.0
RO7ANO	Edinburgh Way, Rochdale	32.3	32.1	25.2
RO8ANO	Manchester Old Road, Rochdale	45.0	44.7	33.6
RO9ANO	Manchester Road, Rochdale	40.5	39.6	30.3
RO24ANO	Ogden Street, Castleton	-(a)	30.0	24.8

Note: a) Monitor commissioned in 2019.

4.3.2 As shown in Table 11, annual mean NO₂ concentrations were above the AQO of 40µg/m³ at the RO8ANO - Manchester Old Road and RO9ANO - Manchester Road monitors in recent years. As these sites are located within an AQMA, exceedences would be expected. Levels were below the AQO at all remaining positions. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 Pollutant concentrations during 2020 were lower than previous years due to a reduction in traffic and associated emissions caused by the COVID-19 pandemic. The results should therefore be viewed with caution.

4.3.4 RBC do not undertake monitoring of PM₁₀ or PM_{2.5} concentrations 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 partially located in two grid squares. Data for these locations were downloaded from the DEFRA website¹⁴ for the purpose of the assessment and are summarised in Table 12.

¹⁴ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

Table 12 Background Pollutant Concentration Predictions

NGR (m)	Predicted Background Pollutant Concentration (µg/m ³)								
	NO ₂			PM ₁₀			PM _{2.5}		
	2019	2023	2025	2019	2023	2025	2019	2023	2025
387500, 410500	14.97	12.65	11.68	11.64	11.11	10.91	7.83	7.44	7.28
388500, 410500	17.48	14.66	13.53	12.30	11.75	11.55	8.36	7.96	7.80

4.4.2 As shown in Table 12, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and AQLV at the development site.

4.5 Sensitive Receptors

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

Construction Phase Sensitive Receptors

4.5.2 Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 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	10 - 100	0
Up to 50	10 - 100	0
Up to 100	More than 100	-
Up to 350	More than 100	-

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

4.5.4 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.

4.5.5 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	The baseline study did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal indicated that a number of applications have recently been submitted in the vicinity of the site. It is therefore possible that there will be concurrent dust generation should these be granted permission and the construction phases overlap with the proposed development
Pre-existing screening between the source and the receptors	Woodland lies directly to the south of the site. This will limit dispersion of dust to receptors in this area. In addition, trees and shrubs are situated along the site boundary. These may act as a barrier between emission sources and receptors should they be retained during construction
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

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 likely that it will extend over one year. The sensitivity of nearby receptors is unlikely to change during this time
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.5.6 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties.

4.5.7 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		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Low	Low	Medium

Operational Phase Sensitive Receptors

4.5.8 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 17. These include worst-case receptors located within the AQMA along the A664 Manchester Road. Receptor heights were included in order to take account of less sensitive land uses at ground floor level, such as retail.

Table 17 Operational Phase Road Vehicle Exhaust Emissions Sensitive Receptor Locations

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Heape Street	388065.0	410413.6	1.5
R2	Residential - Fairway	387932.4	410304.2	1.5
R3	Residential - Heywood Road	387717.7	410526.9	1.5
R4	Residential - Heywood Road	387852.5	410533.9	1.5
R5	Residential - Heywood Road	388256.0	410593.4	1.5
R6	Residential - Heywood Road	388048.1	410494.6	1.5
R7	Residential - Partington Street	387911.7	410664.0	1.5
R8	Residential - Hanover Street	388215.8	410538.6	1.5
R9	Residential - Hanover Street	388161.3	410624.5	1.5
R10	Residential - Durban Street	388119.3	410736.7	3.5
R11	Residential - A664 Manchester Road	388363.1	410442.4	3.5
R12	Residential - A664 Manchester Road	388388.1	410339.2	1.5
R13	Residential - A664 Manchester Road	388461.9	410086.6	1.5
R14	Residential - Trows Lane	388496.8	409943.9	1.5
R15	Residential - Albion Street	388422.7	410483.6	1.5
R16	Residential - A664 Queensway	388855.7	411066.9	1.5
R17	Residential - A664 Queensway	389013.2	411194.4	1.5
R18	Residential - Queens Drive	389170.8	411256.7	1.5
R19	Residential - Dunlop Avenue	389297.2	411414.9	1.5
R20	Residential - Dunlop Avenue	389226.7	411451.6	1.5
R21	Residential - A58	388469.9	411819.5	1.5
R22	Residential - A58	388396.3	411761.3	1.5
R23	Residential - A58 Bolton Road	388347.7	411756.5	1.5
R24	Residential - A58 Bolton Road	387970.9	411784.9	1.5
R25	Residential - A58 Bolton Road	387502.9	411755.3	1.5

Receptor		NGR (m)		Height (m)
		X	Y	
R26	Residential - A664 Manchester Road	388385.4	411701.3	1.5
R27	Residential - A664 Manchester Road	388076.0	411305.1	1.5
R28	Residential - A664 Manchester Road	388053.9	411154.2	1.5
R29	Residential - A664 Manchester Road	388092.6	410873.5	1.5

4.5.9 Reference should be made to Figure 4 for a graphical representation of road vehicle exhaust emission sensitive receptor locations and AQMA designations.

5.0 **ASSESSMENT**

5.1 **Introduction**

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

5.2 **Construction Phase Assessment**

Step 1

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

Step 2

Earthworks

- 5.2.4 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed development site is between 18,000m² and 110,000m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **medium**.

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 8, the development is considered to be a **medium** risk site for dust soiling as a result of earthworks.

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 8 the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

Construction

5.2.7 The total proposed building volume is estimated to be greater than 75,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

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 8, the development is considered to be a **high** 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 8, the development is considered to be a **low** risk site for human health impacts as a result of construction activities.

Trackout

5.2.10 Based on the total site area, it is anticipated that the unpaved road length may be greater than 100m during certain stages of construction. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **large**.

5.2.11 Table 16 indicates the sensitivity of the area to dust soiling effects to people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **high** risk site for dust soiling as a result of trackout activities.

5.2.12 Table 16 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for human health impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

5.2.13 A summary of the risk from each dust generating activity is provided in Table 18.

Table 18 Summary of Potential Unmitigated Dust Risks During Construction

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

5.2.14 As indicated in Table 18, the potential risk of dust soiling is **high** from construction and trackout and **medium** from earthworks. The potential risk of human health impacts is **medium** from trackout and **low** from earthworks and construction.

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

Step 3

5.2.16 The IAQM guidance¹⁵ provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 19. 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.

¹⁵ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

Table 19 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken • Make the complaints log available to the LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	• Undertake daily on-site and off-site inspection to monitor dust, record inspection results, and make the log available to the LA upon request • Carry out regular site inspections to monitor compliance with the DMP, record inspection results and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site • Fully enclose 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 • Cover, seed or fence stockpiles to prevent wind whipping
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 • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials

Issue	Control Measure
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires or burning of waste materials
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 • Only remove cover in small areas during work and not all at once
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 • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos
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 • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits • Access gates to be located at least 10m from receptors where possible

Step 4

5.2.17 Assuming the relevant mitigation measures outlined in Table 19 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁶.

¹⁶ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

5.3 Operational Phase Assessment

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

5.3.2 The assessment considered the following scenarios:

- 2019 - Verification;
- 2025 - DM; and,
- 2025 - DS.

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

5.3.4 For the purpose of the assessment traffic data for 2025 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emissions factors for 2019 were utilised within the dispersion model. The use of 2025 traffic data and 2019 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

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

Predicted Concentrations

5.3.6 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 20. Exceedences of the relevant AQO are shown in **bold**.

Table 20 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Heape Street	18.25	18.62	0.37
R2	Residential - Fairway	17.93	18.04	0.11
R3	Residential - Heywood Road	17.49	17.79	0.30
R4	Residential - Heywood Road	17.81	17.98	0.17
R5	Residential - Heywood Road	24.15	24.33	0.18
R6	Residential - Heywood Road	18.23	18.43	0.20
R7	Residential - Partington Street	17.57	17.78	0.21
R8	Residential - Hanover Street	19.65	19.91	0.26
R9	Residential - Hanover Street	19.36	19.66	0.30
R10	Residential - Durban Street	21.95	22.22	0.27
R11	Residential - A664 Manchester Road	24.21	24.38	0.17
R12	Residential - A664 Manchester Road	25.32	25.46	0.14
R13	Residential - A664 Manchester Road	32.89	33.08	0.19
R14	Residential - Trows Lane	44.02	44.16	0.14
R15	Residential - Albion Street	21.55	21.67	0.12
R16	Residential - A664 Queensway	21.02	21.14	0.12
R17	Residential - A664 Queensway	25.63	25.80	0.17
R18	Residential - Queens Drive	20.07	20.13	0.06
R19	Residential - Dunlop Avenue	25.65	25.74	0.09
R20	Residential - Dunlop Avenue	26.48	26.60	0.12
R21	Residential - A58	26.06	26.16	0.10
R22	Residential - A58	32.40	32.60	0.20
R23	Residential - A58 Bolton Road	29.17	29.38	0.21
R24	Residential - A58 Bolton Road	26.16	26.33	0.17
R25	Residential - A58 Bolton Road	19.32	19.39	0.07

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R26	Residential - A664 Manchester Road	27.75	28.11	0.36
R27	Residential - A664 Manchester Road	21.43	21.61	0.18
R28	Residential - A664 Manchester Road	24.62	24.90	0.28
R29	Residential - A664 Manchester Road	26.11	26.42	0.31

5.3.7 As indicated in Table 20, predicted annual mean NO₂ concentrations were below the relevant AQO at 28 sensitive receptors and above at one position in both scenarios. It should be noted that there are no new predicted exceedences in the DS scenario when compared with the DM.

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

5.3.9 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 21.

Table 21 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Heape Street	12.14	12.21	0.07
R2	Residential - Fairway	12.06	12.09	0.02
R3	Residential - Heywood Road	12.02	12.07	0.05
R4	Residential - Heywood Road	12.08	12.11	0.03
R5	Residential - Heywood Road	13.35	13.38	0.04
R6	Residential - Heywood Road	12.14	12.18	0.04
R7	Residential - Partington Street	12.05	12.09	0.04
R8	Residential - Hanover Street	12.41	12.46	0.05

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R9	Residential - Hanover Street	12.37	12.43	0.05
R10	Residential - Durban Street	12.92	12.97	0.05
R11	Residential - A664 Manchester Road	13.28	13.31	0.03
R12	Residential - A664 Manchester Road	13.53	13.56	0.03
R13	Residential - A664 Manchester Road	14.95	14.99	0.04
R14	Residential - Trows Lane	16.55	16.59	0.03
R15	Residential - Albion Street	12.78	12.81	0.02
R16	Residential - A664 Queensway	12.72	12.74	0.02
R17	Residential - A664 Queensway	13.46	13.50	0.03
R18	Residential - Queens Drive	12.41	12.42	0.01
R19	Residential - Dunlop Avenue	13.55	13.57	0.02
R20	Residential - Dunlop Avenue	13.64	13.67	0.02
R21	Residential - A58	13.78	13.80	0.02
R22	Residential - A58	14.69	14.73	0.04
R23	Residential - A58 Bolton Road	14.19	14.23	0.04
R24	Residential - A58 Bolton Road	13.84	13.88	0.03
R25	Residential - A58 Bolton Road	12.45	12.46	0.01
R26	Residential - A664 Manchester Road	13.98	14.05	0.07
R27	Residential - A664 Manchester Road	12.85	12.89	0.04
R28	Residential - A664 Manchester Road	13.50	13.56	0.06
R29	Residential - A664 Manchester Road	13.75	13.82	0.06

5.3.10 As indicated in Table 21, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

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

5.3.12 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Table 22 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Heape Street	8.14	8.18	0.04
R2	Residential - Fairway	8.10	8.11	0.01
R3	Residential - Heywood Road	8.06	8.10	0.03
R4	Residential - Heywood Road	8.10	8.12	0.02
R5	Residential - Heywood Road	8.83	8.86	0.02
R6	Residential - Heywood Road	8.14	8.16	0.02
R7	Residential - Partington Street	8.08	8.10	0.02
R8	Residential - Hanover Street	8.29	8.32	0.03
R9	Residential - Hanover Street	8.27	8.30	0.03
R10	Residential - Durban Street	8.58	8.61	0.03
R11	Residential - A664 Manchester Road	8.80	8.82	0.02
R12	Residential - A664 Manchester Road	8.95	8.97	0.02
R13	Residential - A664 Manchester Road	9.81	9.84	0.02
R14	Residential - Trows Lane	10.91	10.93	0.02
R15	Residential - Albion Street	8.51	8.53	0.01
R16	Residential - A664 Queensway	8.47	8.48	0.01
R17	Residential - A664 Queensway	8.93	8.95	0.02
R18	Residential - Queens Drive	8.30	8.31	0.01
R19	Residential - Dunlop Avenue	8.96	8.97	0.01

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R20	Residential - Dunlop Avenue	9.02	9.03	0.01
R21	Residential - A58	9.07	9.09	0.01
R22	Residential - A58	9.63	9.65	0.02
R23	Residential - A58 Bolton Road	9.33	9.35	0.02
R24	Residential - A58 Bolton Road	9.11	9.13	0.02
R25	Residential - A58 Bolton Road	8.30	8.31	0.01
R26	Residential - A664 Manchester Road	9.20	9.24	0.04
R27	Residential - A664 Manchester Road	8.54	8.56	0.02
R28	Residential - A664 Manchester Road	8.92	8.95	0.03
R29	Residential - A664 Manchester Road	9.07	9.11	0.04

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

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

Predicted Impacts

5.3.15 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 23.

Table 23 Predicted Impacts - NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Heape Street	Below 75% of AQO	1	Negligible
R2	Residential - Fairway	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R3	Residential - Heywood Road	Below 75% of AQO	1	Negligible
R4	Residential - Heywood Road	Below 75% of AQO	0	Negligible
R5	Residential - Heywood Road	Below 75% of AQO	0	Negligible
R6	Residential - Heywood Road	Below 75% of AQO	1	Negligible
R7	Residential - Partington Street	Below 75% of AQO	1	Negligible
R8	Residential - Hanover Street	Below 75% of AQO	1	Negligible
R9	Residential - Hanover Street	Below 75% of AQO	1	Negligible
R10	Residential - Durban Street	Below 75% of AQO	1	Negligible
R11	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible
R12	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible
R13	Residential - A664 Manchester Road	76 - 94% of AQO	0	Negligible
R14	Residential - Trows Lane	110% or more of AQO	0	Negligible
R15	Residential - Albion Street	Below 75% of AQO	0	Negligible
R16	Residential - A664 Queensway	Below 75% of AQO	0	Negligible
R17	Residential - A664 Queensway	Below 75% of AQO	0	Negligible
R18	Residential - Queens Drive	Below 75% of AQO	0	Negligible
R19	Residential - Dunlop Avenue	Below 75% of AQO	0	Negligible
R20	Residential - Dunlop Avenue	Below 75% of AQO	0	Negligible
R21	Residential - A58	Below 75% of AQO	0	Negligible
R22	Residential - A58	76 - 94% of AQO	1	Negligible
R23	Residential - A58 Bolton Road	Below 75% of AQO	1	Negligible
R24	Residential - A58 Bolton Road	Below 75% of AQO	0	Negligible
R25	Residential - A58 Bolton Road	Below 75% of AQO	0	Negligible
R26	Residential - A664 Manchester Road	Below 75% of AQO	1	Negligible
R27	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R28	Residential - A664 Manchester Road	Below 75% of AQO	1	Negligible
R29	Residential - A664 Manchester Road	Below 75% of AQO	1	Negligible

5.3.16 As indicated in Table 23, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.17 Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 24.

Table 24 Predicted Impacts - PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Heape Street	Below 75% of AQO	0	Negligible
R2	Residential - Fairway	Below 75% of AQO	0	Negligible
R3	Residential - Heywood Road	Below 75% of AQO	0	Negligible
R4	Residential - Heywood Road	Below 75% of AQO	0	Negligible
R5	Residential - Heywood Road	Below 75% of AQO	0	Negligible
R6	Residential - Heywood Road	Below 75% of AQO	0	Negligible
R7	Residential - Partington Street	Below 75% of AQO	0	Negligible
R8	Residential - Hanover Street	Below 75% of AQO	0	Negligible
R9	Residential - Hanover Street	Below 75% of AQO	0	Negligible
R10	Residential - Durban Street	Below 75% of AQO	0	Negligible
R11	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible
R12	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible
R13	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible
R14	Residential - Trows Lane	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R15	Residential - Albion Street	Below 75% of AQO	0	Negligible
R16	Residential - A664 Queensway	Below 75% of AQO	0	Negligible
R17	Residential - A664 Queensway	Below 75% of AQO	0	Negligible
R18	Residential - Queens Drive	Below 75% of AQO	0	Negligible
R19	Residential - Dunlop Avenue	Below 75% of AQO	0	Negligible
R20	Residential - Dunlop Avenue	Below 75% of AQO	0	Negligible
R21	Residential - A58	Below 75% of AQO	0	Negligible
R22	Residential - A58	Below 75% of AQO	0	Negligible
R23	Residential - A58 Bolton Road	Below 75% of AQO	0	Negligible
R24	Residential - A58 Bolton Road	Below 75% of AQO	0	Negligible
R25	Residential - A58 Bolton Road	Below 75% of AQO	0	Negligible
R26	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible
R27	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible
R28	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible
R29	Residential - A664 Manchester Road	Below 75% of AQO	0	Negligible

5.3.18 As indicated in Table 24, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.19 Predicted impacts on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 25.

Table 25 Predicted Impacts - PM_{2.5}

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of AQLV (%)	Impact Significance
R1	Residential - Heape Street	Below 75% of AQLV	0	Negligible

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of AQLV (%)	Impact Significance
R2	Residential - Fairway	Below 75% of AQLV	0	Negligible
R3	Residential - Heywood Road	Below 75% of AQLV	0	Negligible
R4	Residential - Heywood Road	Below 75% of AQLV	0	Negligible
R5	Residential - Heywood Road	Below 75% of AQLV	0	Negligible
R6	Residential - Heywood Road	Below 75% of AQLV	0	Negligible
R7	Residential - Partington Street	Below 75% of AQLV	0	Negligible
R8	Residential - Hanover Street	Below 75% of AQLV	0	Negligible
R9	Residential - Hanover Street	Below 75% of AQLV	0	Negligible
R10	Residential - Durban Street	Below 75% of AQLV	0	Negligible
R11	Residential - A664 Manchester Road	Below 75% of AQLV	0	Negligible
R12	Residential - A664 Manchester Road	Below 75% of AQLV	0	Negligible
R13	Residential - A664 Manchester Road	Below 75% of AQLV	0	Negligible
R14	Residential - Trows Lane	Below 75% of AQLV	0	Negligible
R15	Residential - Albion Street	Below 75% of AQLV	0	Negligible
R16	Residential - A664 Queensway	Below 75% of AQLV	0	Negligible
R17	Residential - A664 Queensway	Below 75% of AQLV	0	Negligible
R18	Residential - Queens Drive	Below 75% of AQLV	0	Negligible
R19	Residential - Dunlop Avenue	Below 75% of AQLV	0	Negligible
R20	Residential - Dunlop Avenue	Below 75% of AQLV	0	Negligible
R21	Residential - A58	Below 75% of AQLV	0	Negligible
R22	Residential - A58	Below 75% of AQLV	0	Negligible
R23	Residential - A58 Bolton Road	Below 75% of AQLV	0	Negligible
R24	Residential - A58 Bolton Road	Below 75% of AQLV	0	Negligible
R25	Residential - A58 Bolton Road	Below 75% of AQLV	0	Negligible
R26	Residential - A664 Manchester Road	Below 75% of AQLV	0	Negligible

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of AQLV (%)	Impact Significance
R27	Residential - A664 Manchester Road	Below 75% of AQLV	0	Negligible
R28	Residential - A664 Manchester Road	Below 75% of AQLV	0	Negligible
R29	Residential - A664 Manchester Road	Below 75% of AQLV	0	Negligible

5.3.20 As indicated in Table 25, impacts on annual mean PM_{2.5} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

Overall Impact Significance

5.3.21 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impact at discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 26.

Table 26 Overall Impact Significance of Road Vehicle Exhaust Emission Impacts

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO₂ concentrations were above the relevant AQO at one receptor and below at 28 locations in the DM scenario Predicted annual mean PM₁₀ and PM_{2.5} concentrations were below the relevant AQO and AQLV at all locations in the DM scenario It is considered unlikely that future air quality conditions will change significantly in the absence of the development given the relatively established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs

Guidance	Comment
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	The assessment assumed that vehicle exhaust emission rates and pollutant background concentrations will not reduce in future years. This provides worst-case results when compared with DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

5.3.22 The IAQM guidance¹⁷ states that only if the impact is greater than **slight**, the effect is considered **significant**. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

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

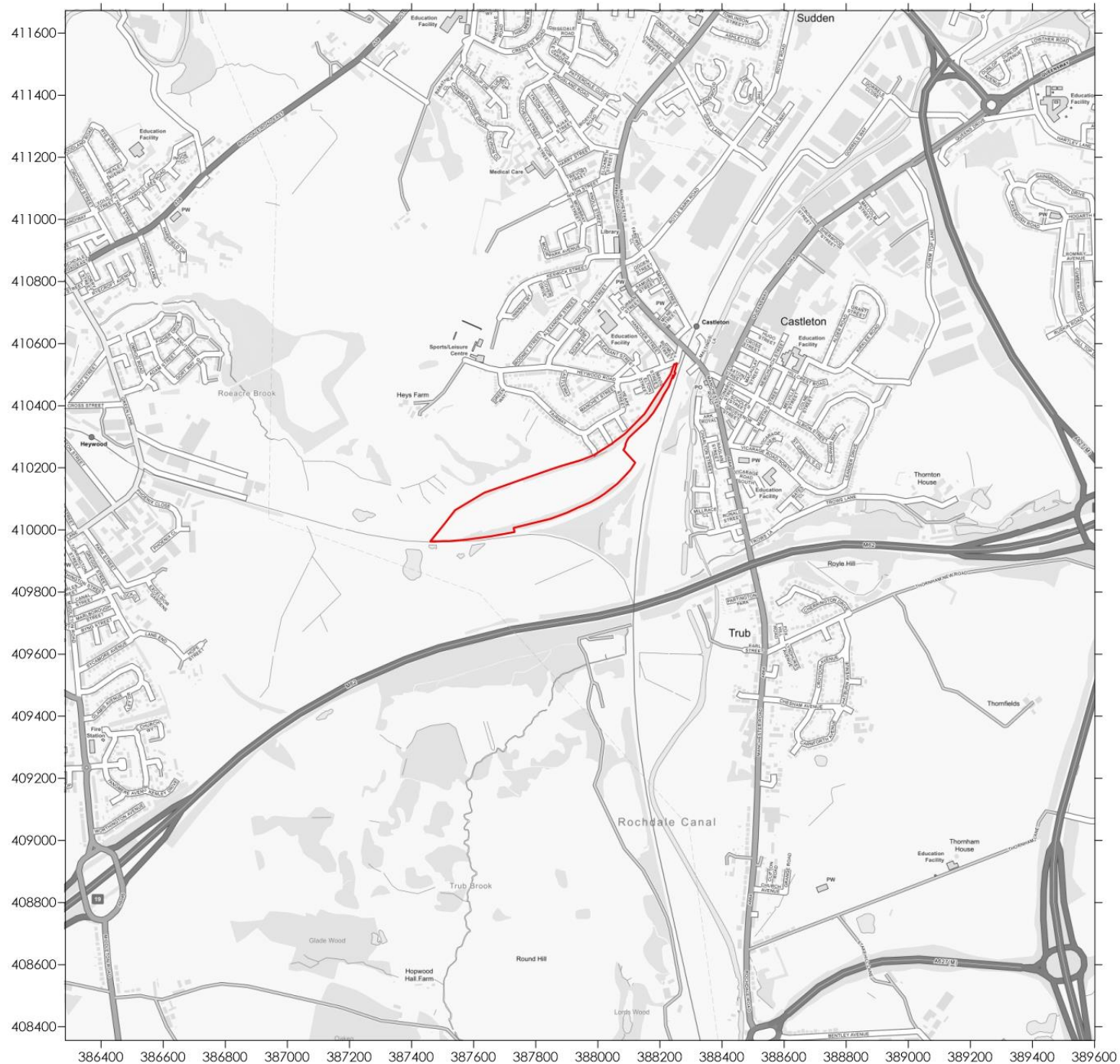
6.0 CONCLUSION

- 6.1.1 Redmore Environmental Ltd was commissioned by Kellen Homes Limited to undertake an Air Quality Assessment in support of a residential development on land at Castle Sidings, Rochdale.
- 6.1.2 The development may lead to adverse air quality effects at sensitive locations during the construction and operational phases. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential impacts as a result of the scheme.
- 6.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **not significant**.
- 6.1.4 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the development in place. Results were subsequently verified using local monitoring data.
- 6.1.5 Review of the dispersion modelling results indicated that impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations as a result of traffic generated by the development were predicted to be **negligible** at all receptor locations. Following consideration of the relevant issues, residual impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.
- 6.1.6 Based on the assessment results, air quality factors are not considered a constraint to the development.

7.0 **ABBREVIATIONS**

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
EB	Eastbound
ELR	East Lancashire Railway
GMCA	Greater Manchester Combined Authority
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
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
RBC	Rochdale Borough Council
SB	Southbound
SP	Slow Phase
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
WB	Westbound
Z ₀	Roughness length

Figures



Legend



Site Boundary

Title

Figure 1 - Site Location Plan

Project

Air Quality Assessment
Castle Sidings, Rochdale

Project Reference

6299

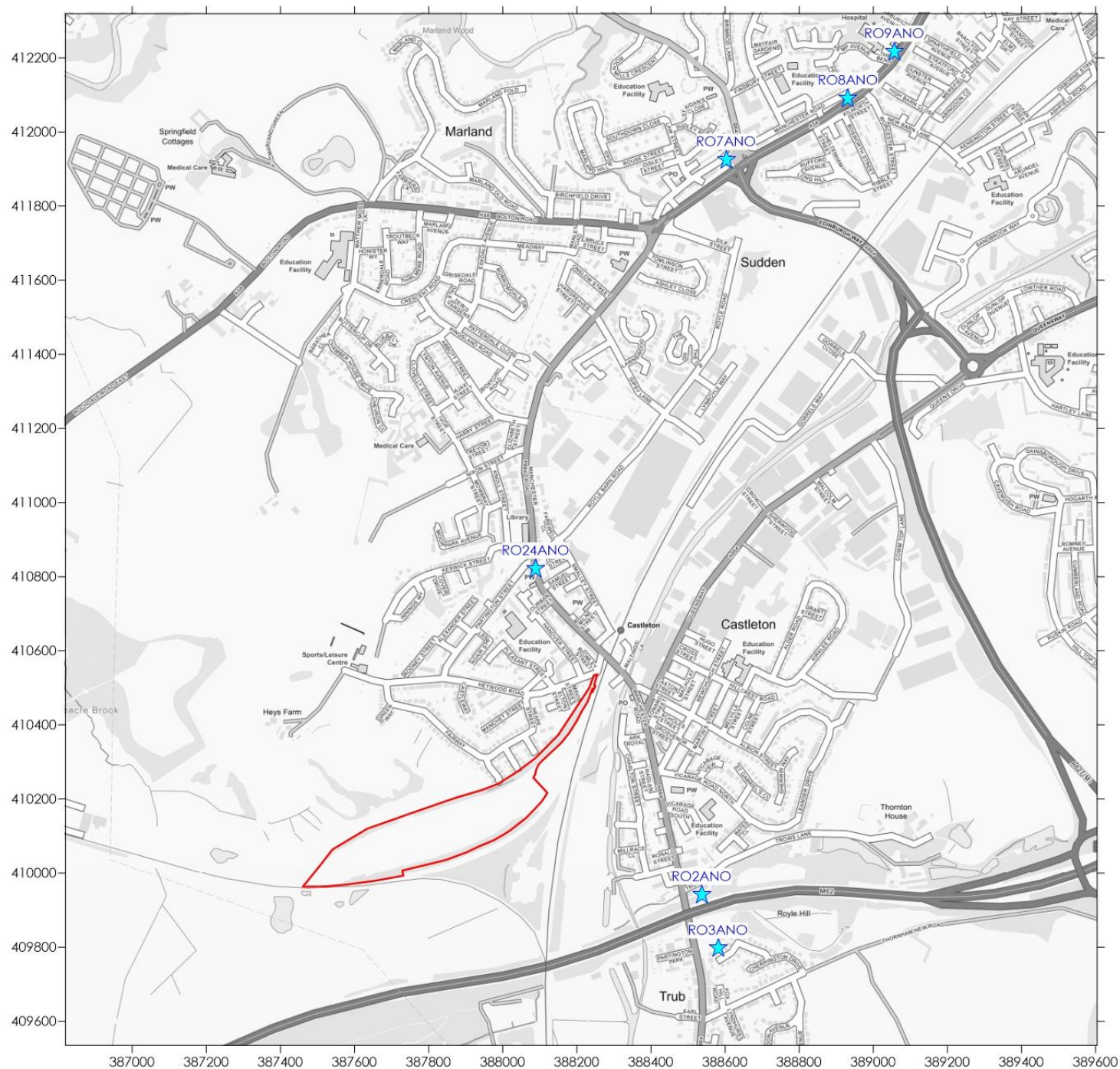
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Legend

-  Site Boundary
-  Monitor

Title

Figure 2 - Monitoring Locations

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Air Quality Assessment
Castle Sidings, Rochdale

Project Reference

6299

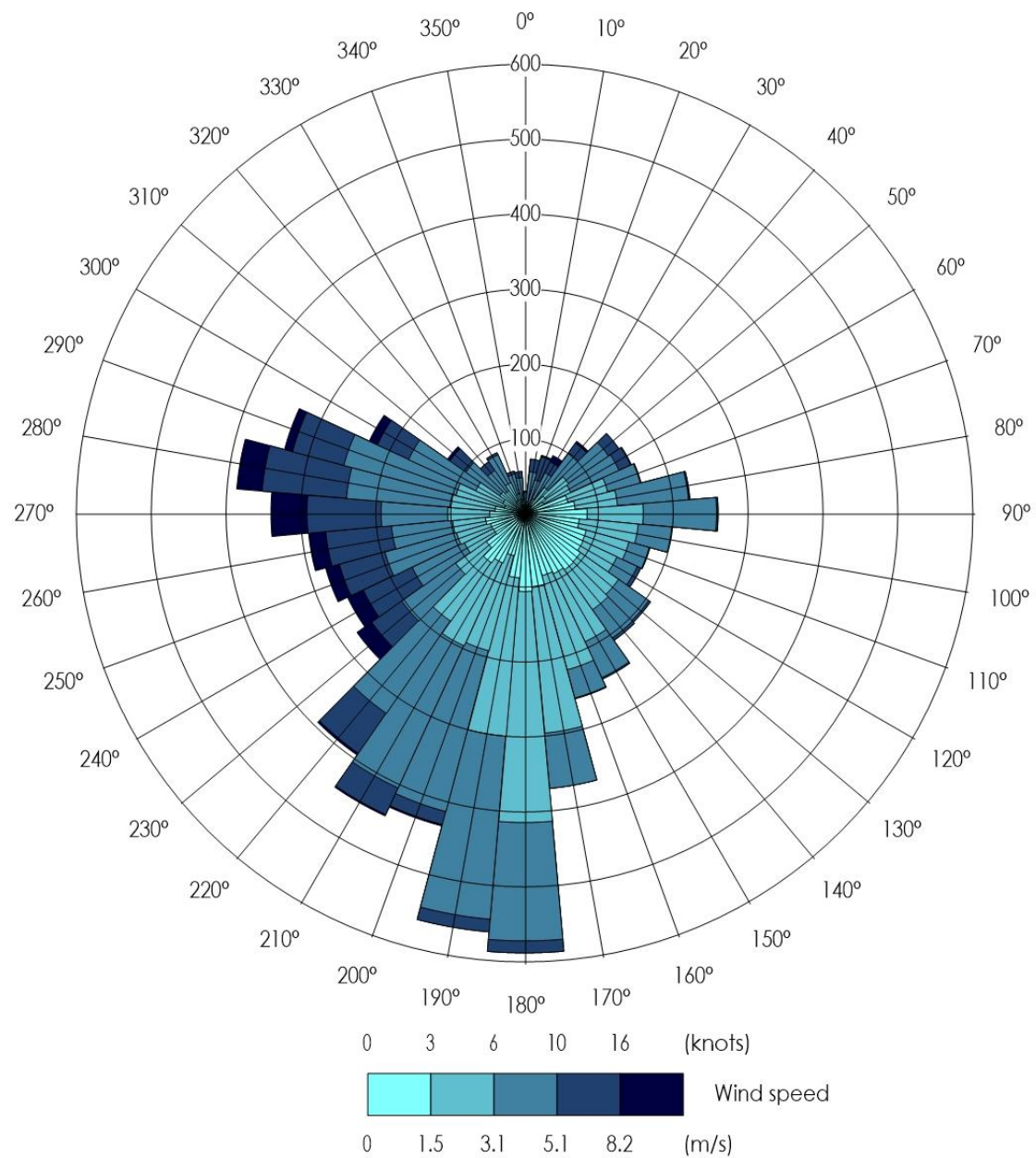
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Title

Figure 3 - Wind Rose of 2019
Manchester Airport Meteorological Data

Project

Air Quality Assessment
Castle Sidings, Rochdale

Project Reference

6299

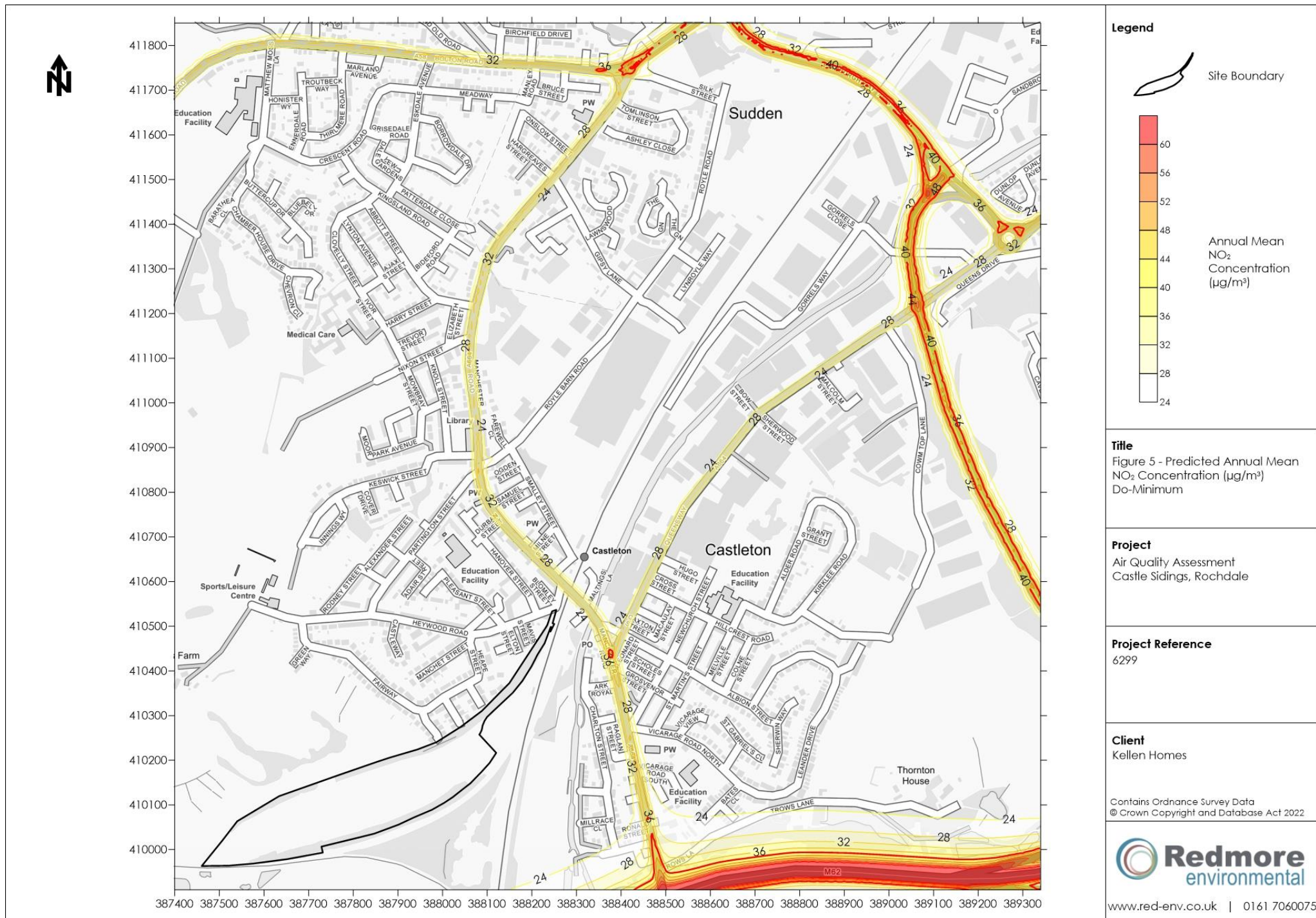
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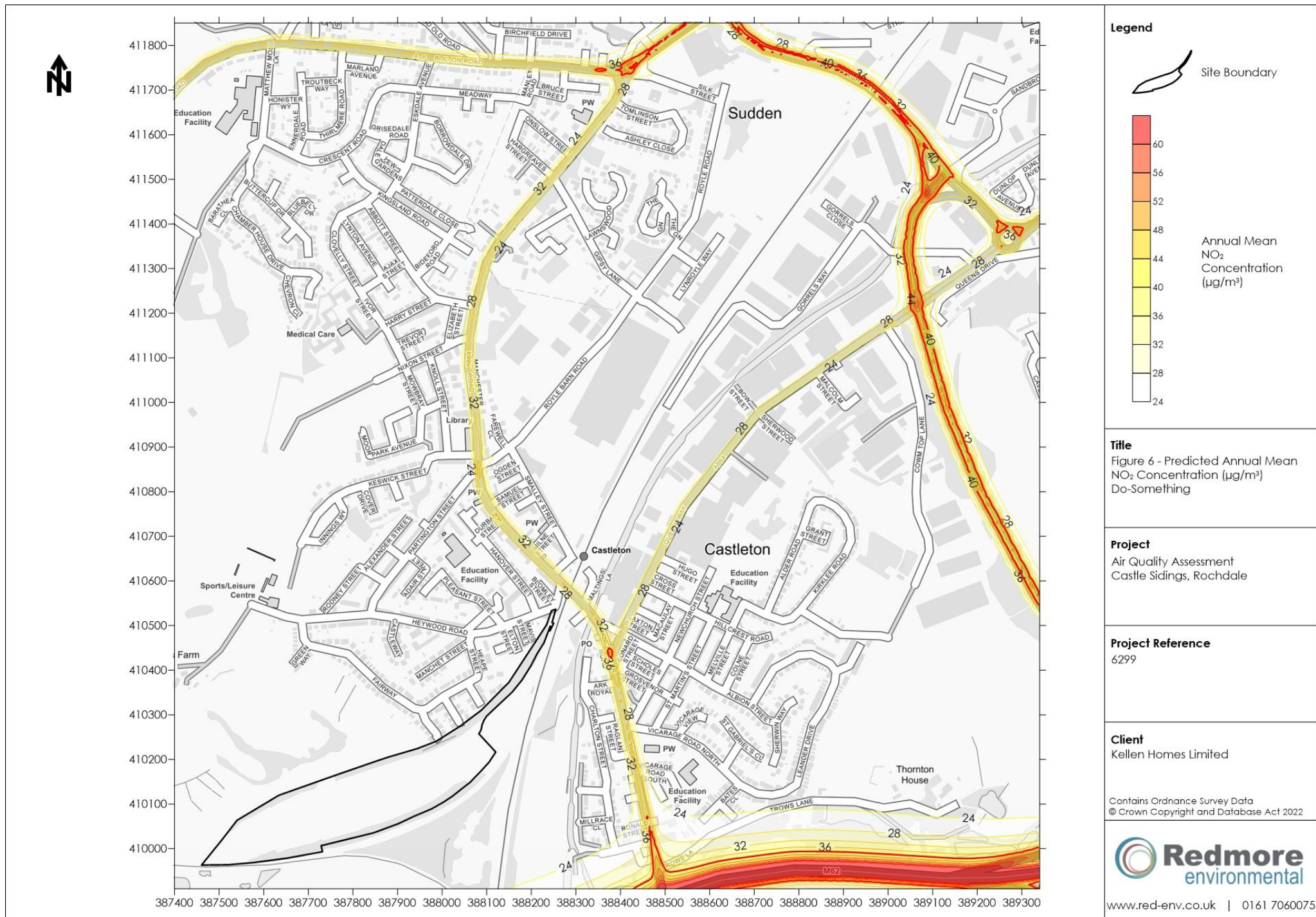
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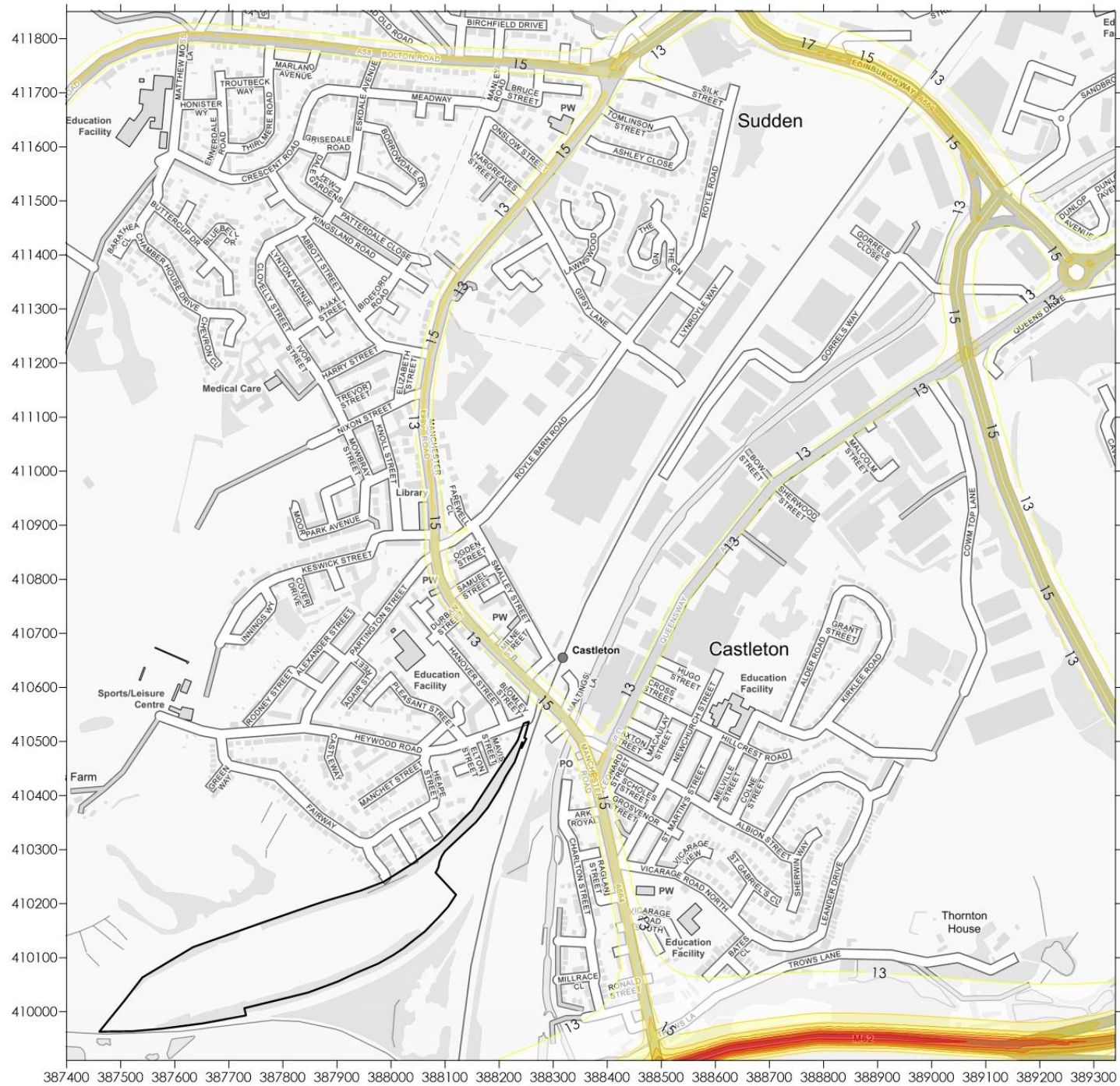


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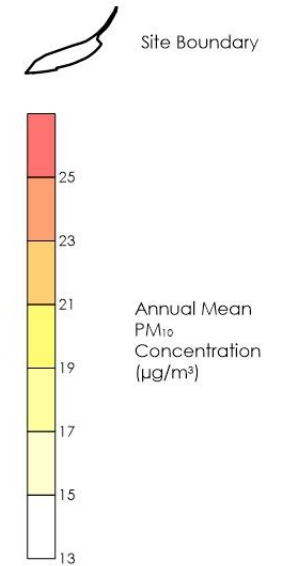








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Title

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

Project

Air Quality Assessment
Castle Sidings, Rochdale

Project Reference

6299

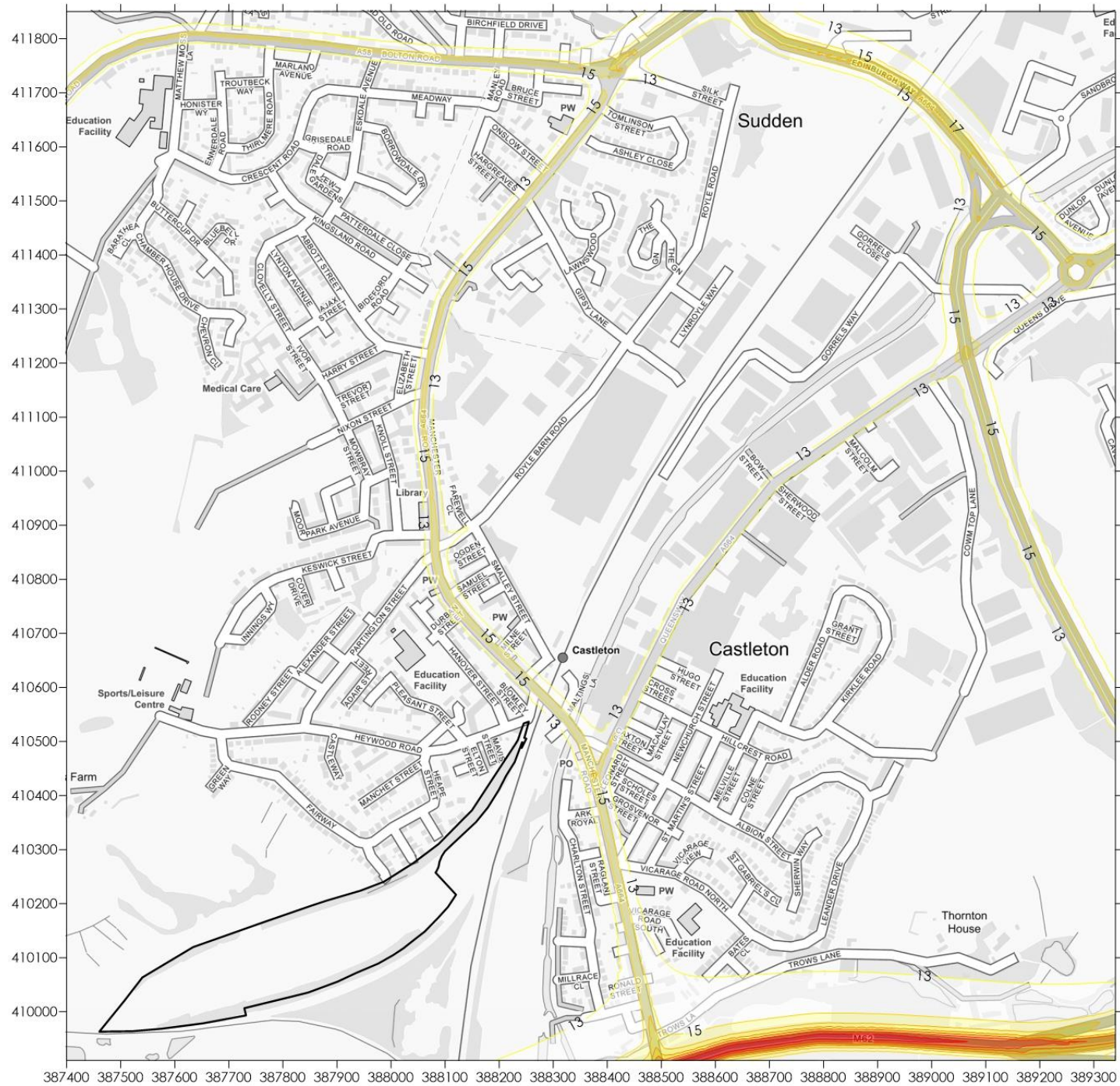
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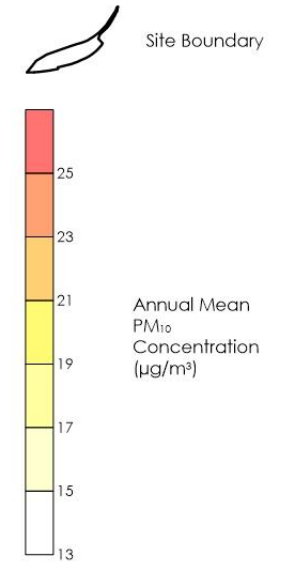
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Title

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

Project

Air Quality Assessment
Castle Sidings, Rochdale

Project Reference

6299

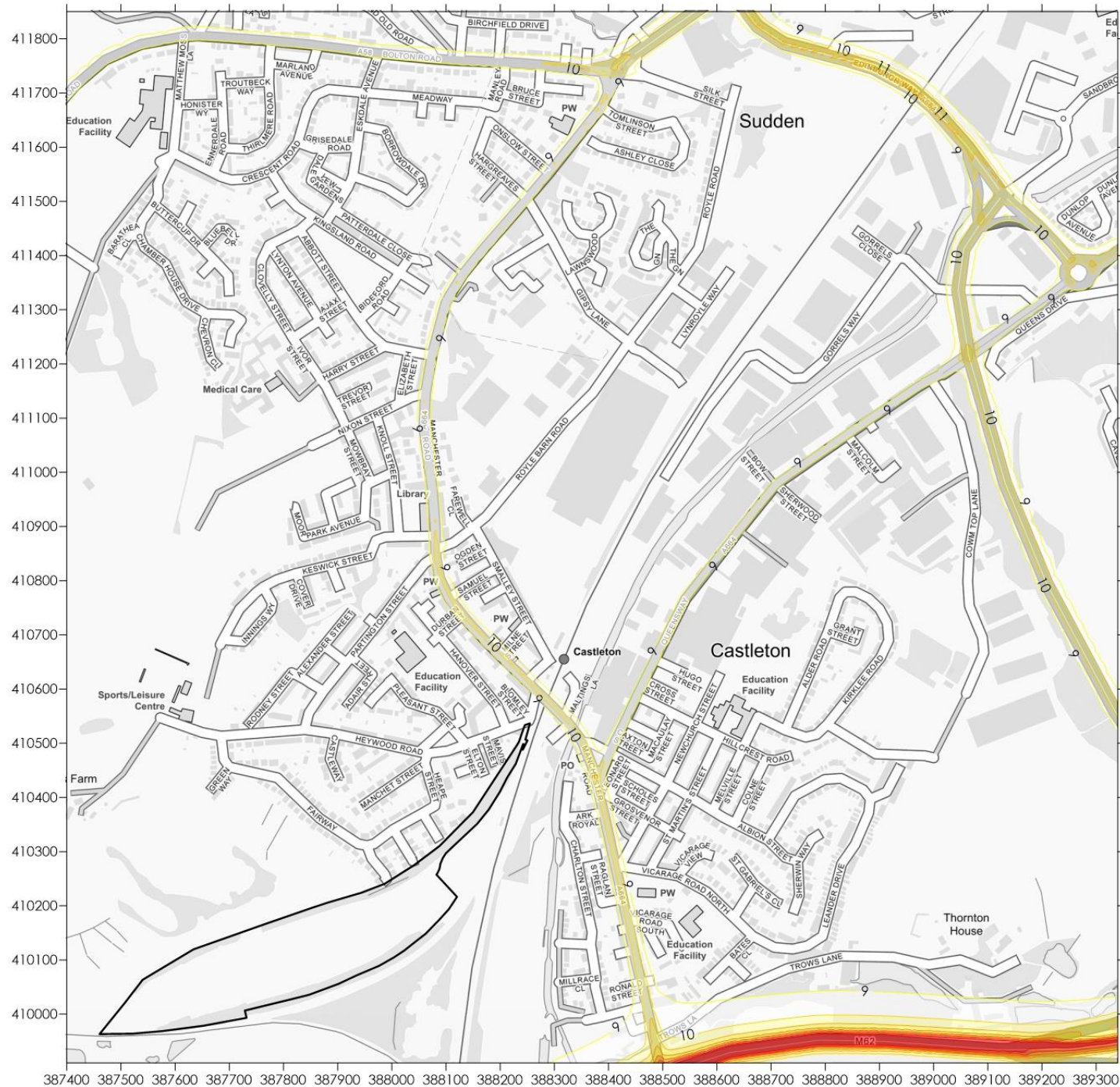
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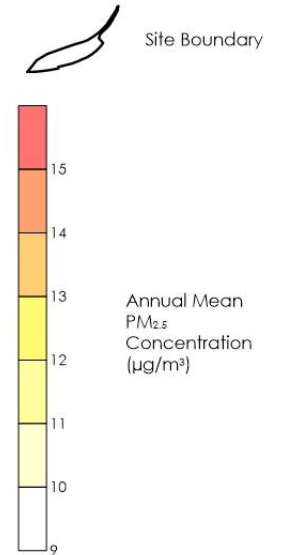
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Title

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

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Air Quality Assessment
Castle Sidings, Rochdale

Project Reference

6299

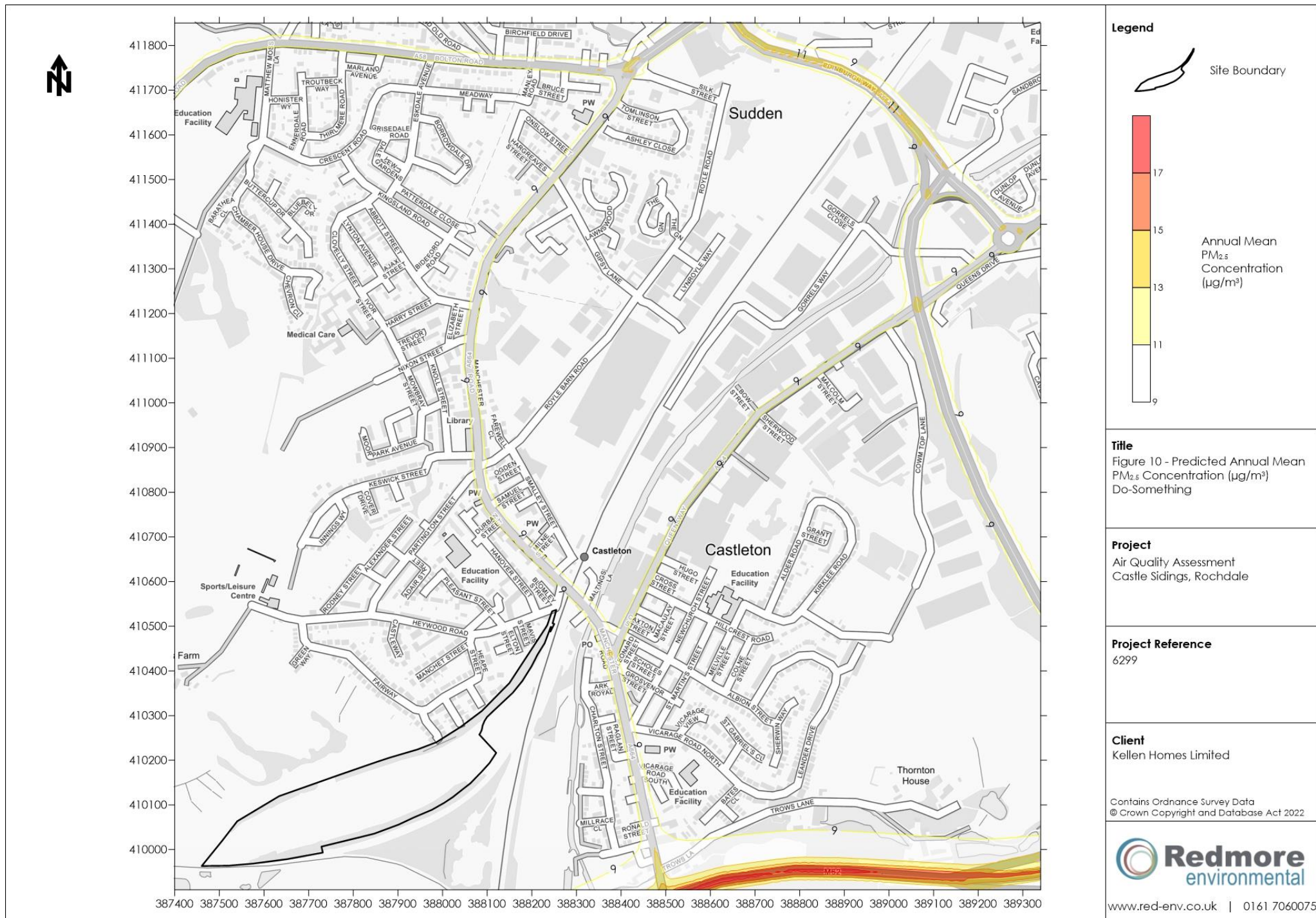
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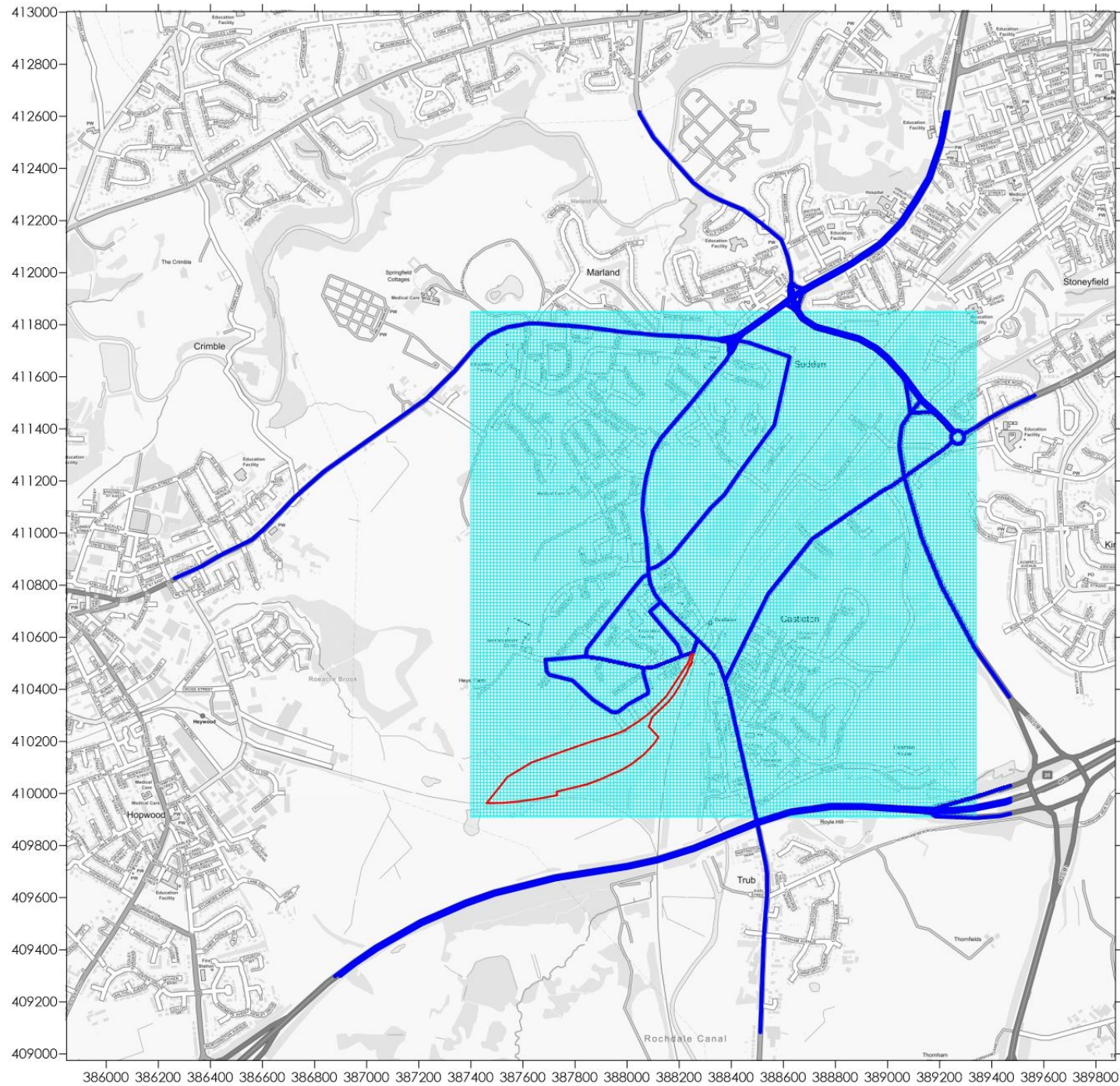
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Legend

-  Site Boundary
-  Road Link
-  Output Grid

Title

Figure 11 - ADMS-Roads Inputs

Project

Air Quality Assessment
Castle Sidings, Rochdale

Project Reference

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Appendix 1 - Assessment Input Data

Introduction

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

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.1.3). 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

Ambient concentrations were predicted over the area NGR: 387400, 409910 to 389340, 411850. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

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

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

Traffic Flow Data

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

Baseline traffic data for the A58, B6452 Roch Valley Way, A627(M) and the M62 were not available from the Transport Consultants and were therefore supplemented with information 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 2021. It should be noted that the DfT web tool is referenced in DEFRA guidance¹⁹ 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 8.0). 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)	Avg. Vehicle Speed (km/h)
		2019	2025 DM	2025 DS			
L1	A664, Manchester Road, North of Partington Street	16,082	17,103	17,678	2.88	8.7	45
L2	A664, Manchester Road, Northbound (NB), South of A58, Slow Phase (SP)	5,355	5,695	5,839	2.88	6.9	30

¹⁸ <https://roadtraffic.dft.gov.uk/#6/55.254/-11.107/basemap-regions-countpoints>.

¹⁹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2019	2025 DM	2025 DS			
L3	A664, Manchester Road, NB, Intersection with A58, SP	5,355	5,695	5,839	2.88	8.5	30
L4	A664, Manchester Road, NB, North of A58, SP	15,926	16,937	17,081	2.98	8.8	30
L5	A58, Manchester Road, Eastbound (EB), Intersection with A664/B6452, SP	15,926	16,937	17,009	2.98	11.3	30
L6	A58, Manchester Road, EB, East of A664 Edinburgh Way, SP	17,889	19,025	19,097	3.71	11.5	30
L7	A58, Manchester Road, EB, West of Kemp Avenue	17,889	19,025	19,097	3.71	6.8	40
L8	A58, Manchester Road, EB, East of Kemp Avenue	17,889	19,025	19,097	3.71	6.9	55
L9	A58, Manchester Road, Westbound (WB), East of Kemp Avenue	18,933	20,135	20,207	3.22	6.8	55
L10	A58, Manchester Road, WB, West of Kemp Avenue	18,933	20,135	20,207	3.22	7.2	40
L11	A58, Manchester Road, WB, East of A664 Edinburgh Way, SP	18,933	20,135	20,207	3.22	10.2	30
L12	A58, Manchester Road, WB, Intersection with A664/B6452, SP	14,973	15,924	16,067	3.35	6.4	30
L13	A58, Manchester Road, WB, West of A664 Edinburgh Way, SP	14,973	15,924	16,067	3.35	7.5	30
L14	A58, Manchester Road, WB, North of A58, Bolton Road	14,973	15,924	16,067	3.35	7.0	45
L15	A664, Manchester Road, Southbound (SB), South of A58, SP	5,355	5,695	5,839	2.88	4.5	30
L16	A664, Manchester Road, NB Slip onto A58, Bolton Road, SP	5,355	5,695	5,983	2.88	5.8	30
L17	A58, Bolton Road, West of A664/A58, Manchester Road	17,136	18,224	18,511	3.16	11.7	45
L18	A58, Bolton Road, EB, West of A664, SP	5,706	6,069	6,212	4.28	3.4	30
L19	A58, Bolton Road, EB, East of A664, SP	5,706	6,069	6,212	9.48	5.6	30
L20	A58, Bolton Road, WB, East of A664, SP	5,706	6,069	6,069	9.48	10.1	30

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2019	2025 DM	2025 DS			
L21	A58, Bolton Road, WB, West of A664, SP	5,706	6,069	6,212	9.48	6.0	30
L22	A58, Bolton Road, EB Slip onto A58, Manchester Road, SP	5,706	6,069	6,069	9.48	6.2	30
L23	A58, Manchester Road, EB, North of A58, Bolton Road	15,926	16,937	17,081	2.98	9.9	45
L24	B6452, Roch Valley Way, North of Roch Mills Crescent	9,997	10,632	10,775	2.34	7.3	60
L25	B6452, Roch Valley Way, South of Roch Mills Crescent	9,997	10,632	10,775	2.34	11.2	40
L26	B6452, Roch Valley Way, SB Slip onto A58, Manchester Road, SP	3,329	3,540	3,540	7.03	5.8	30
L27	B6452, Roch Valley Way, SB, North of A58, Manchester Road, SP	3,329	3,540	3,612	7.03	12.4	30
L28	B6452, Roch Valley Way, NB, North of A58, Manchester Road, SP	3,329	3,540	3,612	7.03	5.1	30
L29	A664, Manchester Road, EB, Slip from A58, Manchester Road, SP	8,731	9,285	9,285	5.68	7.6	30
L30	A664, Manchester Road, EB, South of A58, Manchester Road	8,731	9,285	9,285	5.68	7.6	30
L31	A664, Manchester Road, WB, South of A58, Manchester Road	9,296	9,886	9,886	5.83	12.1	30
L32	A664, Manchester Road, WB, Slip to A58, Manchester Road, SP	9,296	9,886	9,886	5.83	7.8	30
L33	A664, Manchester Road, WB, Intersection with A58, SP	9,296	9,886	9,886	5.83	9.1	30
L34	A664, Manchester Road, EB, Intersection with A58, SP	17,461	18,570	18,570	2.84	8.2	30
L35	A664, Manchester Road, EB, West of A627(M)	17,461	18,570	18,570	2.84	7.5	55
L36	A664, Manchester Road, EB, West of A627(M)	18,591	19,772	19,772	2.92	7.3	55
L37	Royle Barn Road SP	3,914	4,163	4,228	0.00	9.8	30
L38	A664, Manchester Road between Royle Barn Road and Durban Street	19,012	20,219	20,867	2.88	9.5	45

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2019	2025 DM	2025 DS			
L39	A664, Manchester Road between Durban Street and Heywood Road	18,355	19,521	19,737	2.88	9.3	45
L40	A664, Manchester Road north of A664 Queensway	18,902	20,103	20,768	2.88	10.1	45
L41	A664, Manchester Road at A664 Queensway junction SP	18,902	20,103	20,435	2.88	9.3	30
L42	A664, Manchester Road south of A664 Queensway	18,902	20,103	20,435	2.88	7.9	45
L43	A664, Manchester Road Queensway	12,076	12,843	13,176	2.65	6.9	45
L44	A664, Manchester Road Queensway west of roundabout	12,076	12,843	13,176	2.65	16.0	45
L45	A664, Edinburgh Way north of roundabout EB	11,474	12,203	12,369	3.97	11.4	55
L46	A664, Edinburgh Way north of roundabout EB south of A627(M)	8,606	9,152	9,152	5.29	13.6	55
L47	A664, Edinburgh Way north of roundabout EB north of A627(M)	8,606	9,152	9,152	5.29	7.3	55
L48	A664, Edinburgh Way south of A627(M) SP	11,411	12,136	12,302	3.37	8.0	30
L49	A664, Queensway	21,704	23,082	23,249	3.25	13.7	45
L50	A627(M)	36,941	39,287	39,453	5.96	15.6	65
L51	A627(M) between slip roads and A664 Edinburgh Way	27,706	29,465	29,548	7.94	21.7	30
L52	A627(M) north slip road approach to A664, Edinburgh Way EB	9,235	9,822	9,822	23.83	5.4	30
L53	A627(M) north south road exit from A664, Edinburgh Way EB	2,869	3,051	3,134	15.86	7.9	30
L54	Heywood Road SP	1,361	1,448	1,466	0.00	6.6	30
L55	Hanover Street/Durban Street	1,690	1,797	2,229	0.00	6.2	30
L56	Heywood Road east of Heape Street	1,361	1,448	1,897	2.89	6.9	35
L57	Heywood Rod west of Heape Street	745	792	792	2.89	6.2	35

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2019	2025 DM	2025 DS			
L58	Heywood Road west of Partington Street	745	792	1,217	2.89	6.5	35
L59	Fairway west of site access	1,608	1,710	2,134	0.00	6.9	35
L60	Fairway east of site access	1,608	1,710	2,591	0.00	6.8	35
L61	Partington Street	1,203	1,280	1,704	0.00	5.1	35
L62	M62 WB west of Junction 20	61,133	65,015	65,057	15.03	14.3	95
L63	M62 WB east of Junction 20	45,850	48,761	48,761	20.04	11.4	95
L64	M62 WB slip road at Junction 20	15,283	16,254	16,295	15.03	9.5	45
L65	M62 EB east of Junction 20	44,306	47,120	47,120	4.87	11.4	95
L66	M62 EB slip road at Junction 20	14,769	15,707	15,748	14.60	7.4	95
L67	M62 EB west of Junction 20	59,075	62,826	62,868	14.60	14.3	95
R1	A664 Roundabout	14,166	15,066	15,232	3.37	9.9	30

Reference should be made to Figure 11 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 Emission Factor Toolkit (version 11.0). This has been produced by DEFRA and incorporates COPERT 5.3 vehicle emission factors and fleet information.

There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 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 26.9km 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 the 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 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

A z_0 of 0.2m was used to describe the meteorological site. This value 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

Annual mean NO₂, PM₁₀ and PM_{2.5} background concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the site, NGR: 387500, 410500, as shown in Table 12.

Similarly to emissions 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 proposals.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance²⁰.

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. The choice of 2019 as the verification year aligns with the IAQM position statement 'Use of 2020 and 2021 Monitoring Datasets'²¹, which states:

"If you are carrying out an air quality study that includes validation against monitoring data, use 2019 monitoring data as the last typical year"

²⁰ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

²¹ Use of 2020 and 2021 Monitoring Datasets, IAQM, 2021.

Monitoring of NO₂ concentrations was undertaken at six locations within the vicinity of roads included within the model during 2019. The results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance²². The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A1.2.

Table A1.2 NO_x Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
RO2ANO	Trows Lane, Castleton	32.7	35.00
RO3ANO	52 Cherrington Drive, Castleton	22.1	13.44
RO7ANO	Edinburgh Way, Rochdale	32.1	33.73
RO8ANO	Manchester Old Road, Rochdale	44.7	62.09
RO9ANO	Manchester Road, Rochdale	39.6	50.21
RO24ANO	Ogden Street, Castleton	30.0	29.31

The annual mean road NO_x concentrations predicted from the dispersion model and the 2019 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.3.

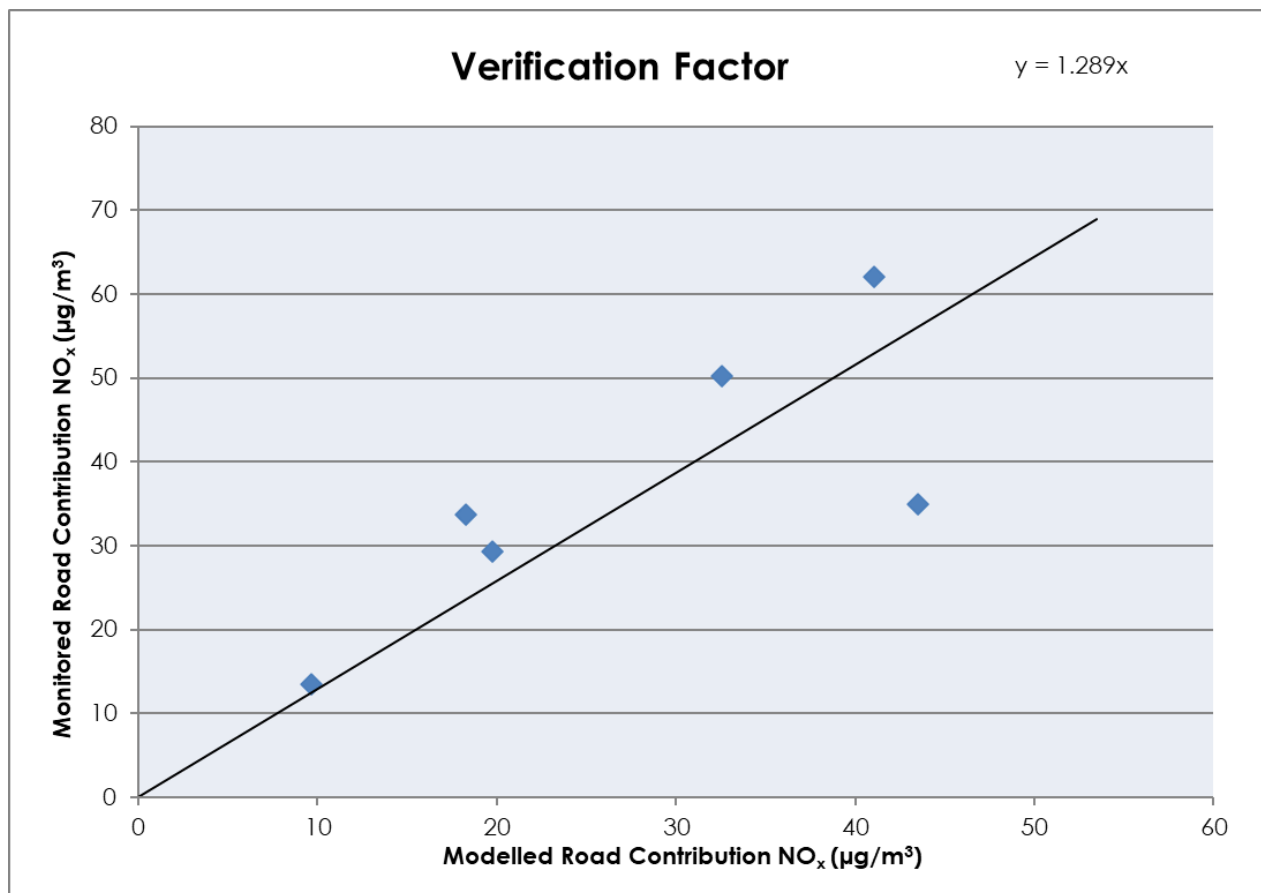
Table A1.3 NO_x Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
RO2ANO	Trows Lane, Castleton	35.00	43.47
RO3ANO	52 Cherrington Drive, Castleton	13.44	9.69
RO7ANO	Edinburgh Way, Rochdale	33.73	18.25
RO8ANO	Manchester Old Road, Rochdale	62.09	41.07
RO9ANO	Manchester Road, Rochdale	50.21	32.59
RO24ANO	Ogden Street, Castleton	29.31	19.77

²² Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.289 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



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

²³ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Appendix 2 - Curricula Vita

KEY EXPERIENCE:

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

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

SELECT PROJECTS SUMMARY:

Industrial

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

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

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

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

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

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

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

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

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

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

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

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

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

Residential

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

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

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

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

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

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

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

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

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

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

KEY EXPERIENCE:

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

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

SELECT PROJECTS SUMMARY:

Bowlers Yard, Manchester

Air Quality Assessment in support of an eleven storey residential development to provide circa 65 units on land known as Bowlers Yard, Manchester. The site was located in an Air Quality Management Area (AQMA) and concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM_{2.5}, PM₁₀ and NO₂ concentrations across the site. Results indicated that pollution levels were below the air quality objectives across the development.

Freemasons Arms Hotel, Heywood

Air Quality Assessment to support a residential-led development in an AQMA. Detailed dispersion modelling was undertaken with the inclusion of advanced canyon modelling to evaluate the impact of the urban topography within the locality on the dispersion of traffic related pollutants. Predicted concentrations of NO₂ were found to exceed air quality criteria at the building façade fronting Market Place at first floor level. As such, mitigation was specified for the affected units to ensure future residents would not be exposed to poor air quality.

Griffin Road, London

Air Quality Assessment in support of a residential development located in an AQMA. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM₁₀ and NO₂ concentrations across the site. Results indicated that pollution levels were classified as APEC - A in accordance with the London Councils Air Quality and Planning Guidance.

High Street, Dudley

Odour Impact Assessment in support of a proposed residential-led development. Due to the location of the site, being above an existing hot food takeaway, odour surveys were required to assess the level of odour across the development. A risk assessment was also undertaken in accordance with the relevant odour guidance. An appropriate ventilation system was identified on the basis of the assessment results.

East Common Lane, Selby

Air Quality Assessment in support of an industrial development on land associated with Access 63 Business Park, East Common Lane Selby. Due to the size of the development it was possible that traffic generated from the scheme may cause negative impacts on sensitive receptors nearby. NO₂ and PM₁₀ concentrations were quantified at specific receptor points to ensure there would be no significant increases in pollution levels. Results revealed negligible impacts.

Wharton Road, Winsford

Air Quality Assessment in support of a residential development of circa 138 units on land off Wharton Road, Winsford. Using sensitive receptors, located in areas where increased road traffic may affect NO₂ concentrations, a comparison was made between overall concentrations with and without the development in place. Results revealed pollutant concentrations were below the relevant standards across the site and impacts were not significant.