

Air Quality Assessment
Kimberworth Road, Rotherham

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Executive Summary

Redmore Environmental Ltd was commissioned by Prospect Estates Limited to undertake an Air Quality Assessment in support of a residential development on land off Kimberworth Road, Rotherham.

The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

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

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

Consideration was made to the Air Quality Supplementary Planning Document produced by the Local Authority. Suitable mitigation measures were subsequently identified in order to reduce potential impacts on air quality in the vicinity of the site.

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

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Appendix 1 - Curricula Vitae

1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Prospect Estates Limited to undertake an Air Quality Assessment in support of a residential development on land off Kimberworth Road, Rotherham.

1.1.2 The development has the potential to cause air quality impacts 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 effects associated with the scheme.

1.2 Site Location and Context

1.2.1 The site is located on land off Kimberworth Road, Rotherham, at approximate National Grid Reference (NGR): 441640, 392905. Reference should be made to Figure 1 for a site location plan.

1.2.2 The proposals comprise a residential development of 120 units with associated infrastructure.

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 development 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 in April 2023¹. The document contains standards, objectives and measures for improving ambient air quality, including a number of 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 and Interim Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/Interim Target

Pollutant	Air Quality Objective/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}	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
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

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

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
1-hour mean	<p>All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets)</p> <p>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</p> <p>Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer</p>	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 (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Dust

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

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

2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of

the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best 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 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 [...]."

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

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?
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?

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

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

2.6 Local Planning Policy

2.6.1 The Core Strategy⁶ forms part of the Rotherham Local Plan and was adopted by Rotherham Metropolitan Borough Council (RMBC) in September 2014. It sets out the high level strategy and policies to guide how Rotherham will change over the next 15 years.

2.6.2 Review of the Core Strategy identified the following policy of relevance to this report:

"Policy CS 14 - Accessible Places and Managing Demand for Travel

The Council will work with partners and stakeholders to focus transport investment on making places more accessible and on changing travel behaviour.

Accessibility will be promoted through the proximity of people to employment, leisure, retail, health and public services by:

[...]

k. Not allowing new development in Air Quality Management Areas unless traffic and air quality impacts are appropriately mitigated.

[...]"

"Policy CS 27 - Community Health and Safety

Development will be supported which protects, promotes or contributes to securing a healthy and safe environment and minimises health inequalities.

Development should seek to contribute towards reducing pollution and not result in pollution or hazards which may prejudice the health and safety of communities or their environments. Appropriate mitigation measures may be required to enable development. When the opportunity arises remedial measures will be

⁶ Core Strategy 2013 - 2028, RMBC, 2014.

taken to address existing problems of land contamination, land stability or air quality.

[...]

New development should be appropriate for its location. Proposals will be required to consider the following factors in locating and designing new development:

a. Whether proposed or existing development contributes to, or is put at unacceptable risk from pollution, natural hazards or land instability

[...]

d. Potential adverse effects of additional development near to hazardous installations and upon Air Quality Management Areas."

2.6.3 The Sites and Policies Document⁷ also forms part of the Local Plan and was adopted by RMBC in June 2018. It provides a clear strategy for development management and supports the delivery of the Core Strategy⁸.

2.6.4 Review of the Sites and Policies Document identified the following policy of relevance to the assessment:

"Policy SP 52 - Pollution Control

Development proposals that are likely to cause pollution, or be exposed to pollution, will only be permitted where it can be demonstrated that mitigation measures will minimise potential impacts to levels that protect health, environmental quality and amenity. When determining planning applications, particular consideration will be given to:

a. the detrimental impact on the amenity of the local area, including an assessment of the risks to public health."

⁷ Sites and Policies Document, RMBC, 2018.

⁸ Core Strategy 2013 - 2028, RMBC, 2014.

2.6.5 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.

3.1.2 The Rotherham Air Quality and Emissions Supplementary Planning Document (SPD)⁹ was adopted by the RMBC in June 2020. Its purpose is to assist reducing emissions to air in the borough. Reference to this document was made throughout the assessment.

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 V2.1'¹⁰.

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.

⁹ Rotherham Air Quality and Emissions SPD, RMBC, 2020.

¹⁰ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

3.2.4 The assessment steps are detailed below.

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	<ul style="list-style-type: none"> 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
	Construction	<ul style="list-style-type: none"> Total building volume greater than 75,000m³ On site concrete batching Sandblasting
	Trackout	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Total building volume 12,000m³ to 75,000m³ Potentially dusty construction material (e.g. concrete) On site concrete batching
	Trackout	<ul style="list-style-type: none"> 20 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Small	Earthworks	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Total building volume less than 12,000m³ Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	<ul style="list-style-type: none"> Less than 20 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m

3.2.12 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	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Internationally or nationally designated site e.g. Special Area of Conservation
Medium	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Nationally designated site e.g. Sites of Special Scientific Interest
Low	<ul style="list-style-type: none"> • Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods e.g. public footpaths, shopping streets, playing fields, farmland, short term car parks and roads 	<ul style="list-style-type: none"> • Locally designated site e.g. Local Nature Reserve

3.2.13 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.

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

3.2.15 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

3.2.16 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

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	
		10 - 100	High	Medium	Low	Low	Low	
		1 - 10	High	Medium	Low	Low	Low	
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low	Low	
		10 - 100	High	Medium	Low	Low	Low	
		1 - 10	Medium	Low	Low	Low	Low	
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low	Low	
		10 - 100	Low	Low	Low	Low	Low	
		1 - 10	Low	Low	Low	Low	Low	
	Medium	Greater than 32µg/m ³	More than 10	High	Medium	Low	Low	Low
			1 - 10	Medium	Low	Low	Low	Low
28 - 32µg/m ³		More than 10	Medium	Low	Low	Low	Low	
		1 - 10	Low	Low	Low	Low	Low	
24 - 28µg/m ³		More than 10	Low	Low	Low	Low	Low	
		1 - 10	Low	Low	Low	Low	Low	
Less than 24µg/m ³		More than 10	Low	Low	Low	Low	Low	
		1 - 10	Low	Low	Low	Low	Low	
Low		-	1 or more	Low	Low	Low	Low	Low

3.2.17 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	High	Medium
Medium	Medium	Low
Low	Low	Low

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

3.2.19 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

3.2.20 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

3.2.21 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance¹¹ to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

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

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

3.3 Operational Phase Assessment

3.3.1 The development has the potential to increase concentrations of NO₂, PM₁₀ and PM_{2.5} as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'¹² guidance to determine the potential for trips generated by the development to affect local air quality.

3.3.2 The following criteria are provided to help establish when an assessment of potential impacts on the local area is likely to be considered necessary:

¹¹ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

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

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

3.3.3 Should these criteria not be met, then the IAQM guidance¹³ considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

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 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), RMBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual and 1-hour mean concentrations of NO₂ are above the AQOs within the borough. As such, eight AQMAs have been declared. The closest of these to the site has been declared for annual mean NO₂ and is described as follows:

"Wortley Road NO₂ AQMA - An area encompassing the Wortley Road and surrounding properties between its junction with the Old Wortley Road and the roundabout with Wilton Gardens."

4.2.2 The development site is located approximately 340m east of the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

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

4.3 Air Quality Monitoring

4.3.1 Monitoring of pollutant concentrations is undertaken by RMBC throughout their area of jurisdiction. Recent NO₂ results recorded in the vicinity of the development are shown in Table 10.

Table 10 Monitoring Results

Monitoring Site		Monitored Annual Mean NO ₂ Concentration (µg/m ³)			
		2019	2020	2021	2022
RDT18	243 Wortley Rd. (LP 11)	38.7	31.8	31.4	19.2
RDT19	227 Wortley Rd. LP9 uphill	36.8	25.8	25.3	25.3
RDT21	Uphill from 264 Wortley Rd.	29.2	23.4	27.1	32.1
RDT22	Upper Wortley Rd/Droppingwell Lane	22.6	18.5	19.5	23.5

4.3.2 As shown in Table 10, annual mean NO₂ concentrations were below the AQO of 40µg/m³ at all monitoring locations in recent years.

4.3.3 Pollutant concentrations recorded during 2020 and 2021 were lower than 2019 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 RMBC do not undertake monitoring of PM₁₀ or PM_{2.5} within the vicinity of the site.

4.4 Background Pollutant Concentrations

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 441500, 392500. Data for this location was downloaded from the DEFRA website¹⁴ for the purpose of the assessment and is summarised in Table 11.

Table 11 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2019	2023	2025
NO ₂	20.19	17.99	17.16
PM ₁₀	12.14	11.55	11.32

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

Pollutant	Predicted Background Pollutant Concentration ($\mu\text{g}/\text{m}^3$)		
	2019	2023	2025
PM _{2.5}	8.24	7.79	7.61

4.4.2 As shown in Table 11, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and Interim Target 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. Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 250m from the development boundary. These are summarised in Table 12.

Table 12 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 to 100	0
Up to 50	10 to 100	0
Up to 100	More than 100	-
Up to 350	More than 100	-

4.5.2 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 250m of the site access. These are summarised in Table 13.

Table 13 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 to 100	0
Up to 50	10 to 100	0

4.5.3 There are no ecological receptors within 50m of the development boundary or the access route within 250m of the site entrance. As such, ecological impacts have not been assessed further within this report.

4.5.4 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 the residential properties.

4.5.5 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 14.

Table 14 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	Low

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 and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements on the local road network also have the potential to result in the re-suspension of dust from 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 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Earthworks

5.2.4 Earthworks may involve excavating material, haulage, tipping and stockpiling. 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 14 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 14 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 Due to the size of the development, the total building volume will be between 12,000m³ and 75,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **medium**.

5.2.8 Table 14 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 construction activities.

5.2.9 Table 14 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 site area and existing hardstanding, it is anticipated that the unpaved road 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 14 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 14 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health impacts as a result of 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 15.

Table 15 Summary of Potential Unmitigated Dust Risks

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

5.2.14 As indicated in Table 15, the potential risk of dust soiling is **high** from trackout and **medium** from construction and earthworks. The potential risk of human health effects is **low** from construction, earthworks and trackout.

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

Step 3

5.2.16 The IAQM 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 16. 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 16 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	<ul style="list-style-type: none"> • 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) or similar, which may include measures to control other emissions, approved by the LA
Site management	<ul style="list-style-type: none"> • 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 off- site, and the action taken to resolve the situation in the log book
Monitoring	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site • Fully enclose specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • Keep site fencing, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used • Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/machinery and sustainable travel	<ul style="list-style-type: none"> • 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

Issue	Control Measure
Operations	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • No bonfires and burning of waste materials
Construction	<ul style="list-style-type: none"> • Avoid scabbling (roughening of concrete surfaces), if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	<ul style="list-style-type: none"> • 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 • Record all inspections of haul routes and any subsequent action in a site log book

Step 4

5.2.17 Assuming the relevant mitigation measures outlined in Table 16 are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁶.

5.3 Operational Phase Assessment

5.3.1 Any vehicle movements associated with the development will generate exhaust emissions on the local and regional road networks. Information provided by Paragon Highways, the Transport Consultants for the project, indicated the development is predicted to generate 502 daily vehicle trips, inclusive of 4 HDV trips. Distribution is summarised in Table 17.

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

Table 17 Development Vehicle Trip Distribution

Link	Change in AADT Flow	In AQMA?
Union Street - Masbrough Street - A630 South	266	No
Garden Street	236	No
Garden Street - New Wortley Road A629 West	80	No
Garden Street - New Wortley Road A629 East	155	No
Garden Street - New Wortley Road A629 West - Wilton Gardens	15	No
Garden Street - New Wortley Road A629 West - Fenton Road	25	No
Garden Street - New Wortley Road A629 West - Wortley Road West	40	Yes

5.3.2 As shown in Table 17, the proposals are not predicted to result in an increase of LDV flows of more than 500 AADT or 100 AADT within an AQMA, include significant highway realignment or the introduction of a junction and there will not be more than 25 HDV movements per day. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM¹⁷ screening criteria shown in Section 3.3.

5.4 **Rotherham Air Quality and Emissions Supplementary Planning Document**

Development Classification

5.4.1 The Rotherham Air Quality and Emissions SPD¹⁸ provides a methodology for determining the scale of a development as minor, medium or major and the required air quality mitigation for the relevant banding. Review of the relevant criteria indicated the proposals were classified as **medium** as:

- The development exceeds the criteria of more than 50 units; and,
- The development does not meet the Additional Trigger Criteria for Major Developments.

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

¹⁸ Rotherham Air Quality and Emissions SPD, RMBC, 2020.

5.4.2 Based on the development classification, a damage costs assessment is required to determine the appropriate amount of required mitigation. This is provided in the following Section.

Damage Cost Assessment

5.4.3 The guidance¹⁹ sets out a Damage Cost Assessment methodology in order to assess the local emissions from a development and determine the appropriate level of mitigation required to help reduce the potential effect on health and/or the local environment.

5.4.4 The first step of the damage cost assessment is to undertake a calculation to identify the monetary value of predicted emissions from the proposals and detail the mitigation measures to control air quality impacts associated with the scheme.

5.4.5 The calculation uses the Emissions Factor Toolkit (EFT) to calculate the amount of transport related pollutant emissions the development is likely to produce. The output is then multiplied by the Interdepartmental Group on Costs and Benefits damage costs for the key pollutants NO_x and PM_{2.5}, and finally multiplied by 5 to provide a five-year exposure cost value. This has been summarised in the following equation:

$$5 \text{ Year Exposure Cost Value} = \text{EFT Output} \times \text{Damage Costs} \times 5$$

5.4.6 It should be noted that the calculation has been undertaken using the most recent damage costs released by DEFRA in March 2023²⁰. The Central Damage Costs for 'Road Transport Urban (Large)' have been applied as the most appropriate descriptor of the area in the vicinity of the site.

5.4.7 The input data values used in the assessment are shown in Table 18.

Table 18 Emissions Assessment - Inputs

Data	Value
Daily Vehicle Movements Produced by Development	502

¹⁹ Rotherham Air Quality and Emissions SPD, RMBC, 2020.

²⁰ Air Quality Appraisal: Damage Cost Guidance, DEFRA, 2023.

Data	Value
HDV Proportion (%)	0.8
Average Speed (km/h)	50
Average Trip Length (km)	10
NO _x Output (kg/year) ^(a)	226
PM _{2.5} Output (kg/year) ^(a)	32
NO _x Output (tonnes/year)	0.23
PM _{2.5} Output (tonnes/year)	0.03
NO _x Damage Costs (£/tonne)	10,649
PM _{2.5} Damage Costs (£/tonne)	78,835

Note: (a) Calculated for 5-year exposure mid point of year 2028.

5.4.8 The calculation is shown in Table 19.

Table 19 Emissions Assessment - Calculation

Data	Value
Annual Cost of NO _x Emissions (£)	2,410
Annual Cost of PM _{2.5} Emissions (£)	2,545
Total Annual Exposure Cost Value (£)	4,955
Total Five Year Exposure Cost Value (£)	24,775

Mitigation

5.4.9 As shown in Table 19, the calculation determined the development should include mitigation measures to reduce the air quality impacts of road traffic emissions equal to £24,775.

5.4.10 In accordance with the guidance²¹, mitigation in the form of one electric vehicle charging point per dwelling with dedicated parking will be provided. The average cost of

²¹ Rotherham Air Quality and Emissions SPD, RMBC, 2020.

a home charging point is approximately £750²². As such, the overall cost would be approximately £90,000. This would therefore exceed the calculated damage cost of £24,775.

5.4.11 In addition to the above, the following initiatives are to be implemented as part of the proposals in order to minimise air quality impacts associated with road traffic emissions:

- Provision of a Travel Plan;
- Improved pedestrian access to public transport; and,
- Site layout designed to encourage walking, including improved pedestrian pathways.

5.4.12 The above measures will be incorporated into the scheme in order to reduce the potential effects on health and the local environment.

²² <https://www.rac.co.uk/electric-cars>.

6.0 CONCLUSION

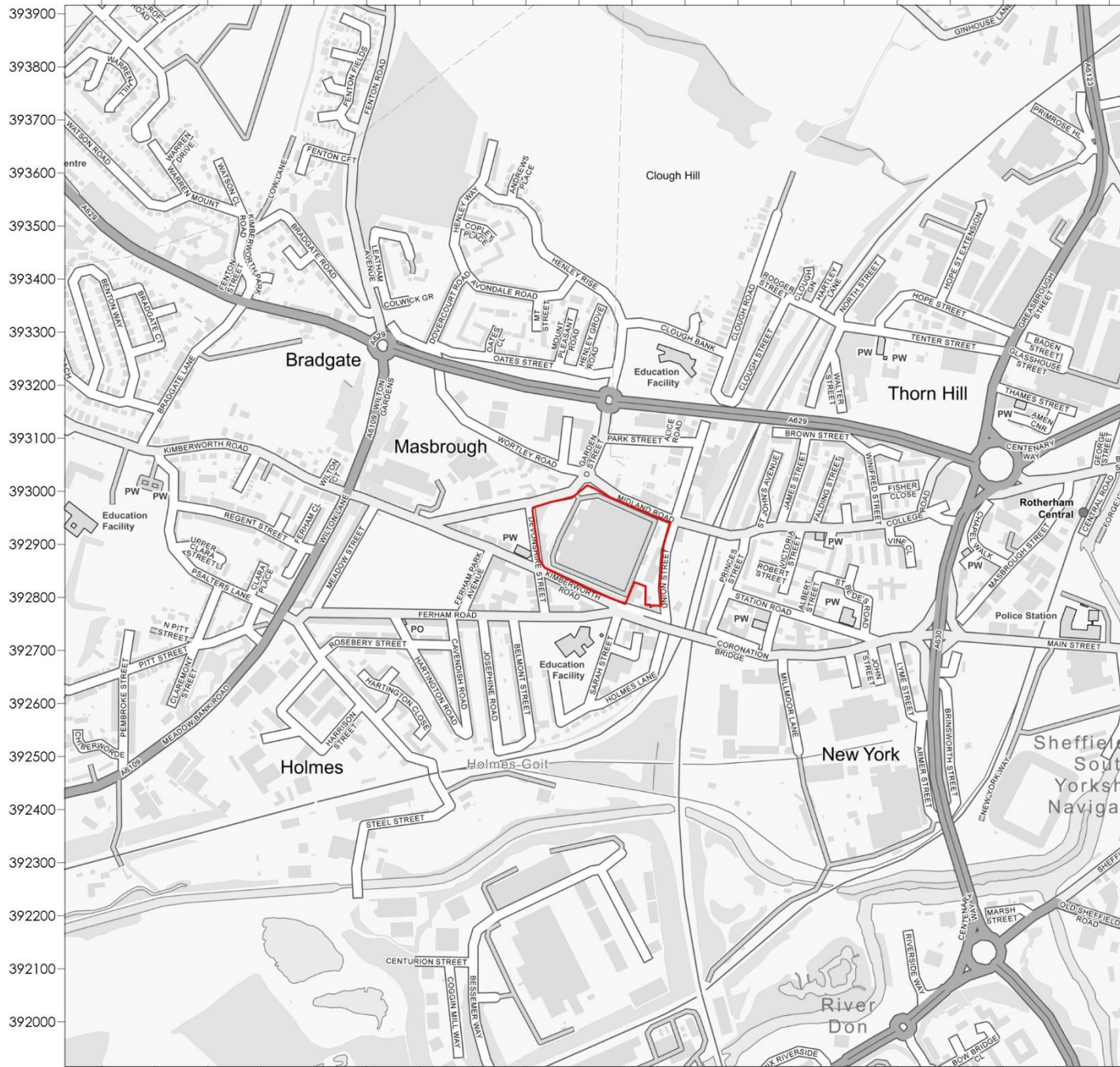
- 6.1.1 Redmore Environmental Ltd was commissioned by Prospect Estates Limited to undertake an Air Quality Assessment in support of a residential development on land off Kimberworth Road, Rotherham.
- 6.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.
- 6.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **not significant**.
- 6.1.4 Potential impacts during the operational phase of the proposed development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against screening criteria provided within the IAQM²³ guidance. Due to the low number of anticipated vehicle trips associated with the proposals, road traffic exhaust emission impacts were predicted to be **not significant**.
- 6.1.5 Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

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

7.0 **ABBREVIATIONS**

ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
DEFRA	Department for Environment, Food and Rural Affairs
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
RMBC	Rotherham Metropolitan Borough Council
SPD	Supplementary Planning Document

Figures



440700 440800 440900 441000 441100 441200 441300 441400 441500 441600 441700 441800 441900 442000 442100 442200 442300 442400 442500 442600

Legend



Title

Figure 1 - Site Location

Project

Air Quality Assessment
Kimberworth Road, Rotherham

Project Reference

7029

Client

Prospect Estates Limited

Contains Ordnance Survey Data
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Appendix 1 - Curriculum Vitae

KEY EXPERIENCE:

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

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

SELECT PROJECTS SUMMARY:

Industrial

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

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

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

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

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

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

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

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

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

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

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

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

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

Residential

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

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

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

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

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

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

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

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

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

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