

Air Quality Assessment

Stevenage Road, Hitchin

Client: Bugler Homes

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Executive Summary

Redmore Environmental Ltd was commissioned by Bugler Homes to undertake an Air Quality Assessment in support of a residential development on land off Stevenage Road, Hitchin.

An Air Quality Assessment was undertaken to:

- Assess potential impacts associated with fugitive dust emissions during the construction phase of the proposed development;
- Assess potential impacts associated with road transport emissions during the operational phase of the proposed development; and,
- Identify any requirement for relevant mitigation measures.

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 the identified site-specific 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 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 to planning consent for the development.

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1.0 INTRODUCTION

1.1 Instruction

- 1.1.1 Redmore Environmental Ltd was commissioned by Bugler Homes to undertake an Air Quality Assessment in support of a residential development on land off Stevenage Road, Hitchin.

1.2 Site Location and Context

- 1.2.1 The site is located on land off Stevenage Road, Hitchin, at approximate National Grid Reference (NGR): 520140, 227930. The relevant Local Authority (LA) is North Hertfordshire District Council (NHDC). Reference should be made to Figure 1 for a map of the site and surrounding area.
- 1.2.2 The proposals comprise the construction of 50 residential dwellings with associated car parking, landscaping and infrastructure works.

1.3 Assessment Scope

- 1.3.1 The proposals have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken to:
- Assess potential impacts associated with fugitive dust emissions during the construction phase of the development;
 - Assess potential impacts associated with road transport emissions during the operational phase of the development; and,
 - Identify any requirement for relevant mitigation measures.
- 1.3.2 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, Interim Target and Concentration Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/ Interim Target/ Concentration Target

Pollutant	Air Quality Objective/ Interim Target/ Concentration 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
	10 ^(b)	Annual mean

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

(b) Concentration Target to be achieved by 2040.

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 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 December 2024 and amended in February 2025. The document 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 achievements 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, 2024.

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 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?

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

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 North Hertfordshire Local Plan 2011-2031⁶ was adopted by NHDC on 8th November 2022 and replaces the saved policies of the District Plan Second Review with Alterations. A review of this document indicated the following of relevance to this assessment:

"Policy D4: Air quality

Planning permission will be granted provided that development proposals:

- a) Give consideration to the potential or actual impact on local air quality, both during the demolition/ construction phase and as a result of its final occupation and use;
- b) Propose appropriate levels of mitigation to minimise emissions to the atmosphere and their potential effects upon health and the local environment; and
- c) Carry out air pollution impact assessments, where required, to determine the impact on local air quality of the development.

Where an air quality impact assessment demonstrates that a development is unacceptable from a local air quality perspective the development will be refused.

Where air pollution impact assessments are not required there will still be a requirement on developers to provide appropriate levels of mitigation to address emissions of pollutants to the atmosphere."

⁶ North Hertfordshire Local Plan 2011-2031, NHDC, 2022.

2.6.2 The above policy was 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 V2.2'⁷.

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 V2.2, IAQM, 2024.

Step 1 - Screen the Need for an Assessment

- 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 - Assess the Risk of Dust Impacts

- 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 3m 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 sensitivities of specific receptors are shown in Table 4.

Table 4 Construction Dust - Sensitivities of People and Ecological Receptors

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 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 250
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 250
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.12 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 250
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	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
		1 - 10	Low	Low	Low	Low

Receptor Sensitivity	Background Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 250
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low

3.2.13 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

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

3.2.15 Table 8 outlines the risk category from earthworks, construction and trackout activities.

Table 8 Construction Dust - Dust Risk Category from Earthworks, Construction and Trackout Activities

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

Step 3 - Site-specific Mitigation

3.2.16 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 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 - Determine Significant Effects

3.2.17 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**.

3.2.18 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:

- 2023 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2028 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2028 should the proposals be completed).

⁸ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

- 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 National Highways guidance⁹ 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 9.

Table 9 Significance of Operational Phase Road Vehicle Exhaust Emissions Impact

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

- 3.3.5 The matrix shown in Table 9 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**.

⁹ LA 105: Air Quality, National Highways, 2024.

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

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

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 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.

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

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), NHDC has undertaken Review and Assessment of air quality within its area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the relevant AQOs within the district. As such, two AQMAs have been declared. The closest of these to the development is described as follows:

"AQMA 1 Stevenage Road, Hitchin - Properties on the south side of Stevenage Road, Hitchin, fronting on to the road, between the Hitchin Hill Three Moorhens PH roundabout and 94-98 Stevenage Road"

- 4.2.2 The proposals are located approximately 220m south-east of the AQMA. As such, there is the potential for emissions associated with the development to increase pollution levels in this sensitive area. This has been considered throughout the assessment. Reference should be made to Figure 2 for the AQMA extent.
- 4.2.3 NHDC 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 NHDC throughout their area of jurisdiction. Recent annual mean NO₂ concentrations recorded in the vicinity of the

development, as provided in the '2024 Air Quality Annual Status Report (ASR)'¹⁴, are shown in Table 10.

Table 10 Monitoring Results - Annual Mean NO₂

Monitoring Site		Monitored Annual Mean NO ₂ Concentration (µg/m ³)		
		2021	2022	2023
NH1	Stevenage Road	31.0	31.0	26.5
S2/NH45	Stevenage Road A	24.7	33.9	25.3
S10/NH103	Westbrook Court	27.1	29.0	27.9
S15/NH87	11 Stevenage Road	18.7	19.9	26.2
S17/NH89	London Road	18.2	19.3	15.0
S18/NH91	BP Garage Stevenage Road	21.8	23.4	19.5
S19/NH92	Stevenage Road (Griffin)	32.7	30.7	27.0
S23/NH116	6 Horseshoe, Park Street	21.3	24.8	23.1
S29/NH104	Dower Court (A), Stevenage Road	20.0	22.5	18.0
S30/NH105	94-98 Stevenage Road	26.1	31.4	26.4
S31/NH106	Morello Gardens, Stevenage Road	22.4	27.0	21.0
S32/NH107	Whitehill Road	20.5	20.9	18.1
S33, S34, S35/ NH110, NH111, NH112	Stevenage Road, AQ Analyser 3	36.8	39.3	35.3
S39	38 Stevenage Road	-(a)	-(a)	24.5
S41/NH82, S38	BP Garage Stevenage Road	21.7	25.9	22.9

Note: (a) Monitor commissioned in 2023.

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

¹⁴ 2024 Air Quality ASR, NHDC, 2024.

4.3.3 Recent 1-hour mean NO₂ results recorded in the vicinity of the development are shown in Table 11.

Table 11 Monitoring Results - 1-hour Mean NO₂

Monitoring Site		Number of 1-Hour Mean NO ₂ Concentrations above 200µg/m ³		
		2021	2022	2023
NH1	Stevenage Road	0	0	0

4.3.4 As shown in Table 11, the number of 1-hour mean NO₂ concentrations above 200µg/m³ was below the permitted number of 18 at the NH1 - Stevenage Road monitor in recent years.

4.3.5 Recent annual mean PM₁₀ concentrations recorded in the vicinity of the development are shown in Table 12.

Table 12 Monitoring Results - Annual Mean PM₁₀

Monitoring Site		Annual Mean PM ₁₀ Concentration (µg/m ³)		
		2021	2022	2023
NH2	Stevenage Road PM	17.0	18.5	17.7

4.3.6 As shown in Table 12, annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ at the NH2 - Stevenage Road PM monitor in recent years.

4.3.7 Recent 24-hour mean PM₁₀ concentrations recorded in the vicinity of the development are shown in Table 13.

Table 13 Monitoring Results - 24-hour Mean PM₁₀

Monitoring Site		Monitored Number of Days with 24-hour Mean PM ₁₀ Concentration above 50µg/m ³		
		2021	2022	2023
NH2	Stevenage Road PM	0	4	1

4.3.8 As shown in Table 13, the number of days with 24-hour mean PM₁₀ concentrations above 50µg/m³ were below the permitted number of 35 at the NH2 - Stevenage Road PM monitor in recent years.

4.3.9 Recent annual mean PM_{2.5} concentrations recorded in the vicinity of the development are shown in Table 14.

Table 14 Monitoring Results - Annual Mean PM_{2.5}

Monitoring Site		Annual Mean PM _{2.5} Concentration (µg/m ³)		
		2021	2022	2023
NH2	Stevenage Road PM	8.0	8.1	-(a)

Note: (a) Data not available for 2023.

4.3.10 As shown in Table 14, annual mean PM_{2.5} concentrations were below the Concentration Target of 10µg/m³ at the NH2 - Stevenage Road PM monitor in recent years.

4.3.11 Pollutant concentrations during 2021 were affected by changes to travel patterns associated with the COVID-19 pandemic. The results should therefore be viewed with caution. However, data for 2022 and beyond is now considered representative of post-pandemic conditions. This is supported by the IAQM¹⁵, who have adopted the following position:

"ambient air quality monitoring data for the year 2022 and beyond is generally considered to represent the current post-pandemic baseline."

4.3.12 Reference should be made to Figure 3 for a map of the survey positions.

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 across three grid

¹⁵ Use of 2020 and 2021 Monitoring Datasets - IAQM Position Statement V1.1, IAQM, 2023.

squares. Data for these locations were downloaded from the DEFRA website¹⁶ for the purpose of the assessment and are summarised in Table 15.

Table 15 Background Pollutant Concentration Predictions

NGR (m)	Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
		2023	2025	2028
519500, 227500	NO ₂	8.23	7.76	6.99
	PM ₁₀	13.14	12.94	12.65
	PM _{2.5}	7.31	7.12	6.87
520500, 227500	NO ₂	8.45	7.93	7.11
	PM ₁₀	13.35	13.16	12.89
	PM _{2.5}	7.18	7.00	6.76
520500, 228500	NO ₂	8.40	8.02	7.32
	PM ₁₀	13.44	13.23	12.95
	PM _{2.5}	7.33	7.14	6.90

4.4.2 As shown in Table 15, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and Concentration 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. These have been defined for construction 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 250m from the development boundary. These are summarised in Table 16.

¹⁶ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021>.

Table 16 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	1 - 10	0
Up to 50	10 - 100	0
Up to 100	More than 100	-
Up to 250	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 250m of the site access. These are summarised in Table 17.

Table 17 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	1 - 10	0
Up to 50	1 - 10	0

- 4.5.4 There are no ecological receptors within 50m of the boundary or the access route within 250m of the site entrance. As such, ecological impacts have not been assessed further within this report.
- 4.5.5 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 and Kingshott School.

Operational Phase Sensitive Receptors

- 4.5.6 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 18.

Table 18 Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Stevenage Road	520211.2	227791.6
R2	Educational - Kingshott School	519790.3	228029.7
R3	Residential - Stevenage Road	519500.7	228200.5
R4	Residential - Stevenage Road	519228.7	228231.9
R5	Residential - Stevenage Road	519068.7	228276.3
R6	Residential - Stevenage Road	518938.8	228284.7
R7	Residential - Stevenage Road	518785.4	228319.9
R8	Residential - Stevenage Road	518864.3	228328.5
R9	Residential - Stevenage Road	518717.3	228330.4
R10	Residential - London Road	518677.3	228283.1
R11	Residential - Hitchin Hill	518649.2	228410.0
R12	Residential - Park Way	518569.5	228324.3
R13	Residential - London Road	518793.8	228144.4
R14	Residential - London Road	519018.8	227817.1
R15	Residential - Park Street	518487.9	228566.2
R16	Residential - Park Street	518585.4	228839.3
R17	Residential - Whitehill Road	519042.5	228821.9
R18	Educational - Goslings Playgroup	519285.2	228421.3

4.5.7 Reference should be made to Figure 2 for a graphical representation of road vehicle exhaust emissions sensitive receptor locations.

5.0 CONSTRUCTION PHASE ASSESSMENT

5.1 Introduction

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

5.2 Step 1 - Screen the Need for an Assessment

- 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 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

5.3 Step 2a - Define the Potential Dust Emission Magnitude

Earthworks

- 5.3.1 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed 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**.

Construction

- 5.3.2 Due to the size of the development, the total building volume is likely to 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**.

Trackout

- 5.3.3 Based on the site area, it is anticipated that the unpaved road length may be more 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**.

5.4 Step 2b - Define the Sensitivity of the Area

Dust Soiling

- 5.4.1 Table 16 shows that there are between 1 and 10 **high** sensitivity receptors within 20m of the site boundary. The sensitivity of the area with respect to dust soiling from earthworks and construction, as defined using the criteria summarised in Table 5, is therefore considered to be **medium**.
- 5.4.2 Table 17 shows that there are between 1 and 10 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to dust soiling from trackout, as defined using the criteria summarised in Table 5, is therefore considered to be **medium**.

Human Health

- 5.4.3 As shown in Table 15, the annual mean PM₁₀ background concentration at the site is 13.23µg/m³. As shown in Table 6, where the background annual mean PM₁₀ concentration is below 24µg/m³ and there are between 1 and 10 **high** sensitivity receptors within 20m of the site boundary, the sensitivity of the area to potential human health impacts from earthworks and construction is **low**.

5.4.4 There are between 1 and 10 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to human health from trackout, as defined using the criteria in Table 6, is therefore considered to be **low**.

5.5 Step 2c - Define the Risk of Dust Impacts

5.5.1 The derived dust emission magnitude for each activity has been combined with the sensitivity of the area to determine the risk of unmitigated impacts in line with the methodology set out in Table 8. A summary of the risk from each dust generating activity is provided in Table 19.

Table 19 Summary of Potential Unmitigated Dust Risks

Potential Impact	Activity	Step 2A - Dust Emission Magnitude	Step 2B - Sensitivity of the Area	Step 2C - Risk
Dust Soiling	Earthworks	Medium	Medium	Medium
	Construction	Medium	Medium	Medium
	Trackout	Large	Medium	Medium
Human Health	Earthworks	Medium	Low	Low
	Construction	Medium	Low	Low
	Trackout	Large	Low	Low

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

5.5.3 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.

5.6 Step 3 - Site-specific Mitigation

5.6.1 The IAQM guidance¹⁷ provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 20. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the LA.

Table 20 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • Develop and implement a Dust Management Plan, which may include measures to control other emissions, approved by the LA
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken • Make the complaints log available to the LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	• Carry out regular site inspections, 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

¹⁷ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

Issue	Control Measure
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 - 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
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
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 stores 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

5.7 Step 4 - Determine Significant Effects

- 5.7.1 Assuming the relevant mitigation measures outlined in Table 20 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁸.

¹⁸ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

6.0 OPERATIONAL PHASE ASSESSMENT

6.1 Introduction

6.1.1 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. 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.

6.1.2 The assessment considered the following scenarios:

- 2023 - Verification;
- 2028 - DM; and,
- 2028 - DS.

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

6.1.4 For the purpose of the assessment, traffic data for 2028 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors and background concentrations for 2023 were utilised within the dispersion model. The use of 2028 traffic data and 2023 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollutant concentrations.

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

6.2 Predicted Concentrations

6.2.1 Annual mean NO₂ 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 NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Stevenage Road	13.88	13.90	0.02
R2	Educational - Kingshott School	14.19	14.21	0.02
R3	Residential - Stevenage Road	18.40	18.43	0.03
R4	Residential - Stevenage Road	19.69	19.72	0.03
R5	Residential - Stevenage Road	24.78	24.82	0.04
R6	Residential - Stevenage Road	18.70	18.73	0.03
R7	Residential - Stevenage Road	20.12	20.15	0.03
R8	Residential - Stevenage Road	23.66	23.70	0.04
R9	Residential - Stevenage Road	26.22	26.28	0.06
R10	Residential - London Road	17.36	17.40	0.04
R11	Residential - Hitchin Hill	23.58	23.63	0.05
R12	Residential - Park Way	17.41	17.43	0.02
R13	Residential - London Road	12.68	12.70	0.02
R14	Residential - London Road	12.92	12.95	0.03
R15	Residential - Park Street	14.71	14.72	0.01
R16	Residential - Park Street	14.87	14.89	0.02
R17	Residential - Whitehill Road	11.42	11.43	0.01
R18	Educational - Goslings Playgroup	11.92	11.93	0.01

6.2.2 As indicated in Table 21, predicted annual mean NO₂ concentrations were below the AQO of 40µg/m³ at all receptor locations in both scenarios.

6.2.3 Reference should be made to Figures 4 and 5 for graphical representations of annual mean NO₂ concentrations across the assessment area for the DM and DS scenarios, respectively.

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

Table 22 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Stevenage Road	15.53	15.53	0.00
R2	Educational - Kingshott School	15.62	15.62	0.00
R3	Residential - Stevenage Road	16.10	16.10	0.00
R4	Residential - Stevenage Road	16.30	16.31	0.00
R5	Residential - Stevenage Road	16.97	16.98	0.01
R6	Residential - Stevenage Road	16.18	16.18	0.00
R7	Residential - Stevenage Road	16.32	16.32	0.00
R8	Residential - Stevenage Road	16.81	16.81	0.01
R9	Residential - Stevenage Road	16.79	16.79	0.01
R10	Residential - London Road	15.85	15.85	0.00
R11	Residential - Hitchin Hill	16.49	16.50	0.01
R12	Residential - Park Way	15.83	15.83	0.00
R13	Residential - London Road	15.48	15.48	0.00
R14	Residential - London Road	15.51	15.51	0.00
R15	Residential - Park Street	15.67	15.67	0.00
R16	Residential - Park Street	15.70	15.71	0.00
R17	Residential - Whitehill Road	15.34	15.34	0.00
R18	Educational - Goslings Playgroup	15.39	15.39	0.00

6.2.5 As indicated in Table 22, predicted annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ at all receptor locations in both scenarios.

- 6.2.6 Reference should be made to Figures 6 and 7 for graphical representations of annual mean PM₁₀ concentrations across the assessment area for the DM and DS scenarios, respectively.
- 6.2.7 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 23.

Table 23 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Stevenage Road	8.94	8.94	0.00
R2	Educational - Kingshott School	8.98	8.98	0.00
R3	Residential - Stevenage Road	9.24	9.24	0.00
R4	Residential - Stevenage Road	9.34	9.35	0.00
R5	Residential - Stevenage Road	9.71	9.71	0.00
R6	Residential - Stevenage Road	9.28	9.28	0.00
R7	Residential - Stevenage Road	9.35	9.36	0.00
R8	Residential - Stevenage Road	9.62	9.62	0.00
R9	Residential - Stevenage Road	9.61	9.61	0.00
R10	Residential - London Road	9.10	9.10	0.00
R11	Residential - Hitchin Hill	9.45	9.46	0.00
R12	Residential - Park Way	9.10	9.10	0.00
R13	Residential - London Road	8.90	8.90	0.00
R14	Residential - London Road	8.91	8.91	0.00
R15	Residential - Park Street	9.00	9.01	0.00
R16	Residential - Park Street	9.02	9.02	0.00
R17	Residential - Whitehill Road	8.82	8.82	0.00
R18	Educational - Goslings Playgroup	8.85	8.85	0.00

6.2.8 As indicated in Table 23, predicted annual mean PM_{2.5} concentrations were below the Concentration Target of 10µg/m³ at all receptor locations in both scenarios.

6.2.9 Reference should be made to Figures 8 and 9 for graphical representations of annual mean PM_{2.5} concentrations across the assessment area for the DM and DS scenarios, respectively.

6.3 Predicted Impacts

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

Table 24 Predicted Impacts - Annual Mean NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R2	Educational - Kingshott School	Below 75% of AQO	0	Negligible
R3	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R4	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R5	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R6	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R7	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R8	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R9	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R10	Residential - London Road	Below 75% of AQO	0	Negligible
R11	Residential - Hitchin Hill	Below 75% of AQO	0	Negligible
R12	Residential - Park Way	Below 75% of AQO	0	Negligible
R13	Residential - London Road	Below 75% of AQO	0	Negligible
R14	Residential - London Road	Below 75% of AQO	0	Negligible
R15	Residential - Park Street	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R16	Residential - Park Street	Below 75% of AQO	0	Negligible
R17	Residential - Whitehill Road	Below 75% of AQO	0	Negligible
R18	Educational - Goslings Playgroup	Below 75% of AQO	0	Negligible

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

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

Table 25 Predicted Impacts - Annual Mean PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R2	Educational - Kingshott School	Below 75% of AQO	0	Negligible
R3	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R4	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R5	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R6	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R7	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R8	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R9	Residential - Stevenage Road	Below 75% of AQO	0	Negligible
R10	Residential - London Road	Below 75% of AQO	0	Negligible
R11	Residential - Hitchin Hill	Below 75% of AQO	0	Negligible
R12	Residential - Park Way	Below 75% of AQO	0	Negligible
R13	Residential - London Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R14	Residential - London Road	Below 75% of AQO	0	Negligible
R15	Residential - Park Street	Below 75% of AQO	0	Negligible
R16	Residential - Park Street	Below 75% of AQO	0	Negligible
R17	Residential - Whitehill Road	Below 75% of AQO	0	Negligible
R18	Educational - Goslings Playgroup	Below 75% of AQO	0	Negligible

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

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

Table 26 Predicted Impacts - Annual Mean PM_{2.5}

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of Concentration Target (%)	Impact Significance
R1	Residential - Stevenage Road	76 - 94% of Concentration Target	0	Negligible
R2	Educational - Kingshott School	76 - 94% of Concentration Target	0	Negligible
R3	Residential - Stevenage Road	76 - 94% of Concentration Target	0	Negligible
R4	Residential - Stevenage Road	76 - 94% of Concentration Target	0	Negligible
R5	Residential - Stevenage Road	95 - 102% of Concentration Target	0	Negligible
R6	Residential - Stevenage Road	76 - 94% of Concentration Target	0	Negligible
R7	Residential - Stevenage Road	76 - 94% of Concentration Target	0	Negligible

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of Concentration Target (%)	Impact Significance
R8	Residential - Stevenage Road	95 - 102% of Concentration Target	0	Negligible
R9	Residential - Stevenage Road	95 - 102% of Concentration Target	0	Negligible
R10	Residential - London Road	76 - 94% of Concentration Target	0	Negligible
R11	Residential - Hitchin Hill	95 - 102% of Concentration Target	0	Negligible
R12	Residential - Park Way	76 - 94% of Concentration Target	0	Negligible
R13	Residential - London Road	76 - 94% of Concentration Target	0	Negligible
R14	Residential - London Road	76 - 94% of Concentration Target	0	Negligible
R15	Residential - Park Street	76 - 94% of Concentration Target	0	Negligible
R16	Residential - Park Street	76 - 94% of Concentration Target	0	Negligible
R17	Residential - Whitehill Road	76 - 94% of Concentration Target	0	Negligible
R18	Educational - Goslings Playgroup	76 - 94% of Concentration Target	0	Negligible

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

6.4 Overall Impact Significance

6.4.1 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the predicted impact at any discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 27.

Table 27 Overall Significance of Operational Phase Road Vehicle Exhaust Emission Impacts

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were below the relevant AQOs and Concentration Target at all locations in the DM and DS scenarios The predicted concentrations are considered unlikely to change significantly in the absence of the proposals given the established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs and Concentration Target
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	It was assumed that vehicle exhaust emission rates and background concentrations will not reduce in future years. This provides conservative 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

6.4.2 The IAQM guidance¹⁹ 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.

6.5 Interim Planning Guidance for PM_{2.5}

6.5.1 Interim Planning Guidance²⁰ on the consideration of the PM_{2.5} targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise emissions of PM_{2.5} and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 28, along with the development response.

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

²⁰ <https://uk-air.defra.gov.uk/pm25targets/planning>.

Table 28 Interim Planning Guidance

Question	Response
How has exposure to PM_{2.5} been considered when selecting the development site? Factors to consider include: • Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these • Site proximity to pollution sources and the impact of these on users of the development • Exposure and emissions during both construction and in-use	The site is bordered by residential properties to the east, by Kingshott School to the west and by agricultural fields to the north and south. As such, local receptors have the potential to be affected by road vehicle exhaust emissions associated with vehicles travelling to and from the site. However, emissions from the development are unlikely to have an impact on these receptors. This is supported by the assessment results summarised in Section 6.3 The residential development is set back from major road sources by approximately 20m and future residents are unlikely to be exposed to elevated pollution concentrations, as shown in Figure 4 to 9 As outlined in Table 20, a number of mitigation measures will be used throughout the construction phase in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations
What actions and/or mitigations have been considered to reduce PM_{2.5} exposure for development users and nearby receptors and to reduce emissions of PM_{2.5} and its precursors? Factors to consider include: • Site layout • The development's design • Technology used in the construction or installed for use in the development • Construction and future use of the development	Mitigation has been incorporated into the design of the scheme in order to reduce PM_{2.5} exposure for future residents. This comprises the following: • Residential units are set back from Stevenage Road and associated road vehicle exhaust emissions by approximately 20m • A number of trees will be planted in between proposed dwellings and Stevenage Road providing a natural barrier In order to reduce emissions of PM_{2.5} with associated impacts at nearby receptors, the following measures have been included within the scheme: • Provision of one secure cycle storage space per dwelling to encourage the use of sustainable transport modes • Provision of a minimum of 50 Electric Vehicle charging points to encourage the use of low emission vehicles • Air Source Heat Pumps will utilise for heating and hot water to reduce atmospheric emissions Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities

6.5.2 Based on the responses provided in Table 28 and the results of the assessment, as outlined in Sections 5.0 and 6.0, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of PM_{2.5}.

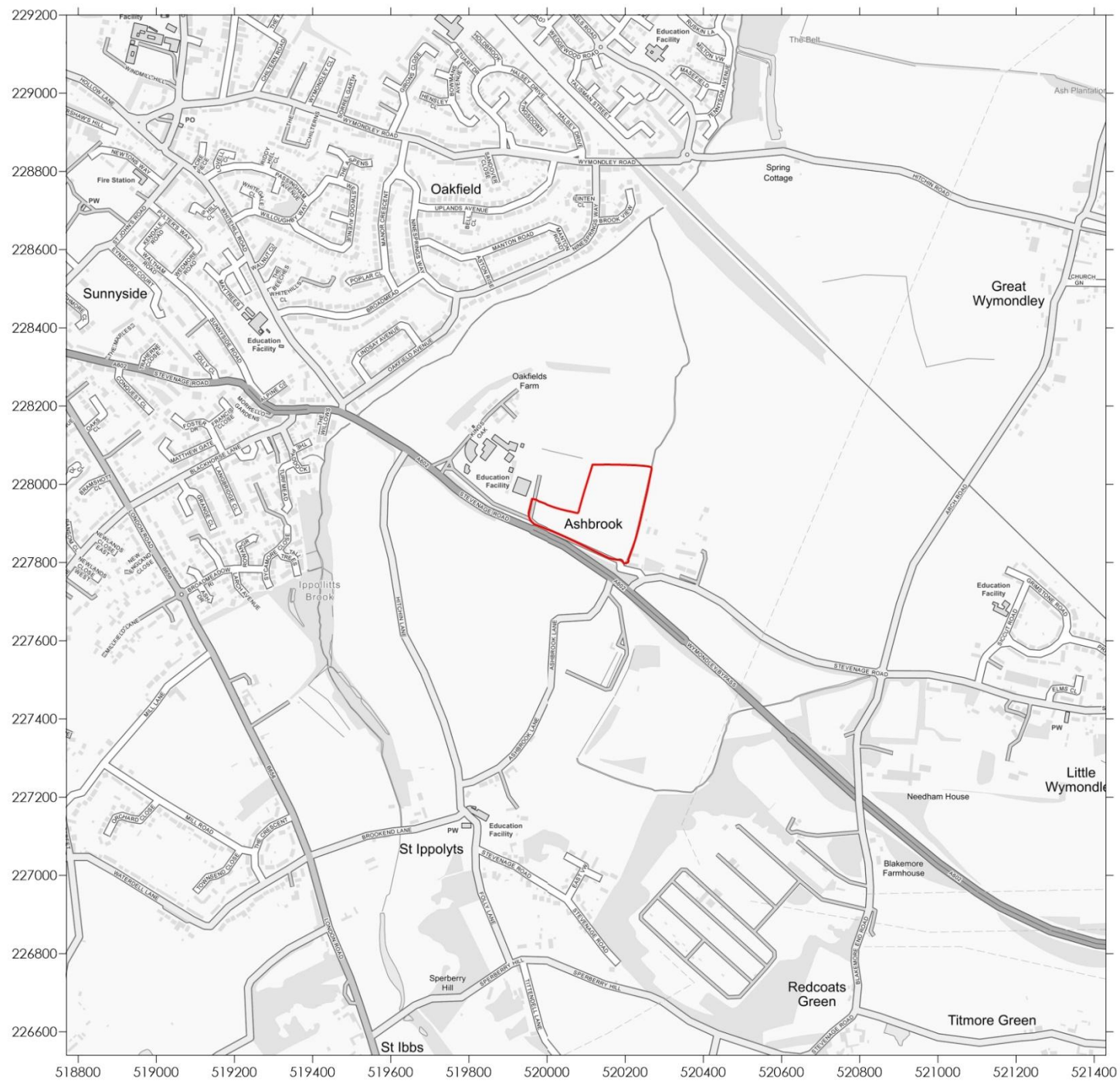
7.0 CONCLUSION

- 7.1.1 Redmore Environmental Ltd was commissioned by Bugler Homes to undertake an Air Quality Assessment in support of a residential development on land off Stevenage Road, Hitchin.
- 7.1.2 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 as a result of the construction and operation of the proposals.
- 7.1.3 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. Site-specific dust control measures were subsequently determined. Following implementation, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities are predicted to be **not significant**.
- 7.1.4 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.
- 7.1.5 Review of the dispersion modelling results indicated that impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations as a result of traffic exhaust emissions associated with 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.
- 7.1.6 Based on the assessment results, air quality factors are not considered a constraint to the development.

8.0 **ABBREVIATIONS**

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQMA	Air Quality Management Area
AQLV	Air Quality Limit Value
AQO	Air Quality Objective
AQS	Air Quality Strategy
ASR	Annual Status Report
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DM	Do-Minimum
DS	Do-Something
EB	Eastbound
EFT	Emissions Factor Toolkit
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NGR	National Grid Reference
NHDC	North Hertfordshire District Council
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
RMSE	Root Mean Squared Error
SP	Slow Phase
WB	Westbound
Z ₀	Roughness length

Figures



Legend



Site Boundary

Title

Figure 1 - Site Location

Project

Air Quality Assessment
Stevenage Road, Hitchin

Project Reference

10117 / KPM 31263

Client

Bugler Homes

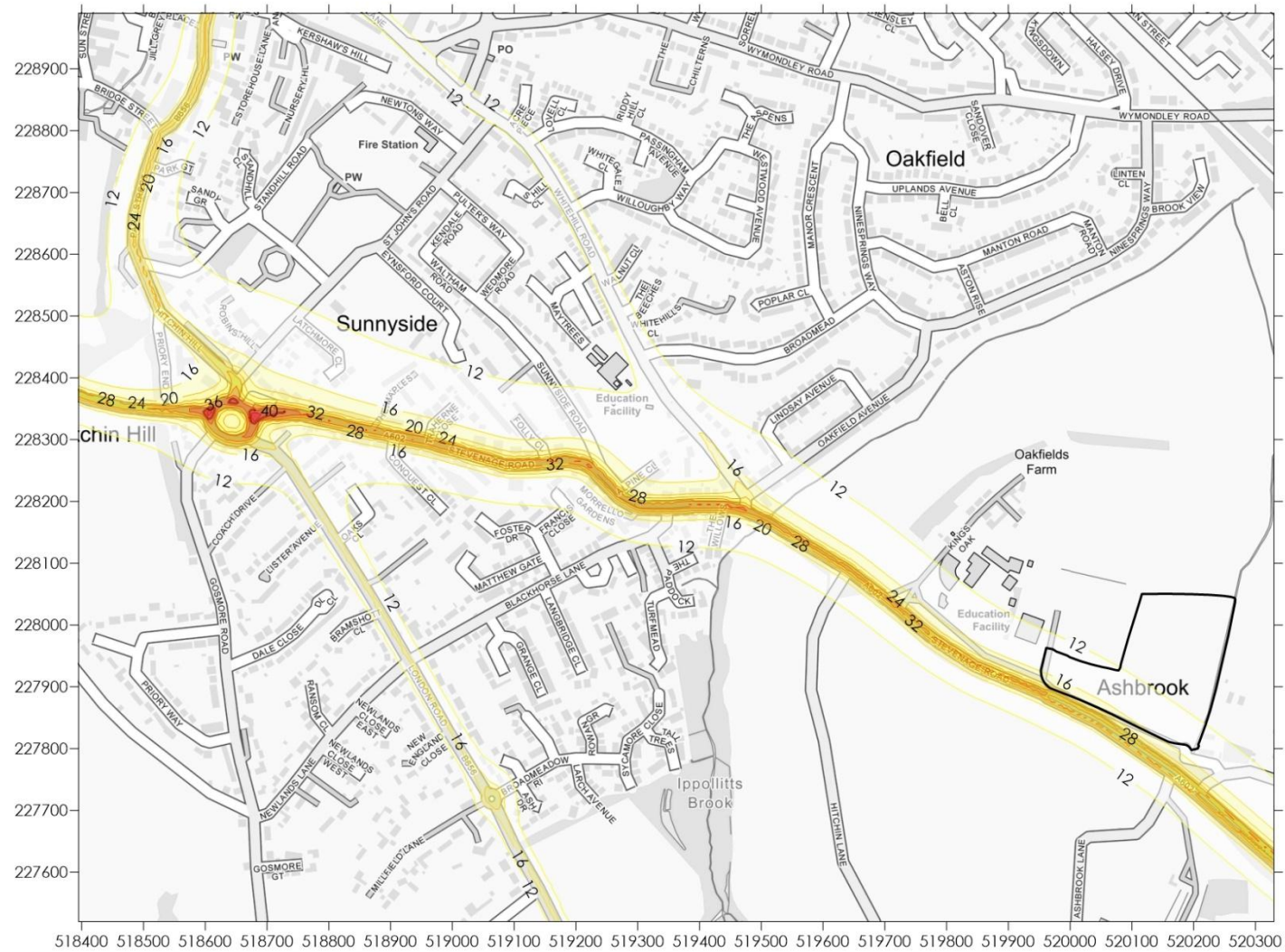
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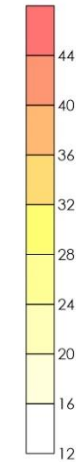




Legend



Site Boundary



Annual Mean
NO₂
Concentration
(µg/m³)

Title

Figure 4 - Predicted Annual Mean
NO₂ Concentrations (µg/m³)
Do-Minimum

Project

Air Quality Assessment
Stevenage Road, Hitchin

Project Reference

10117 / KPM 31263

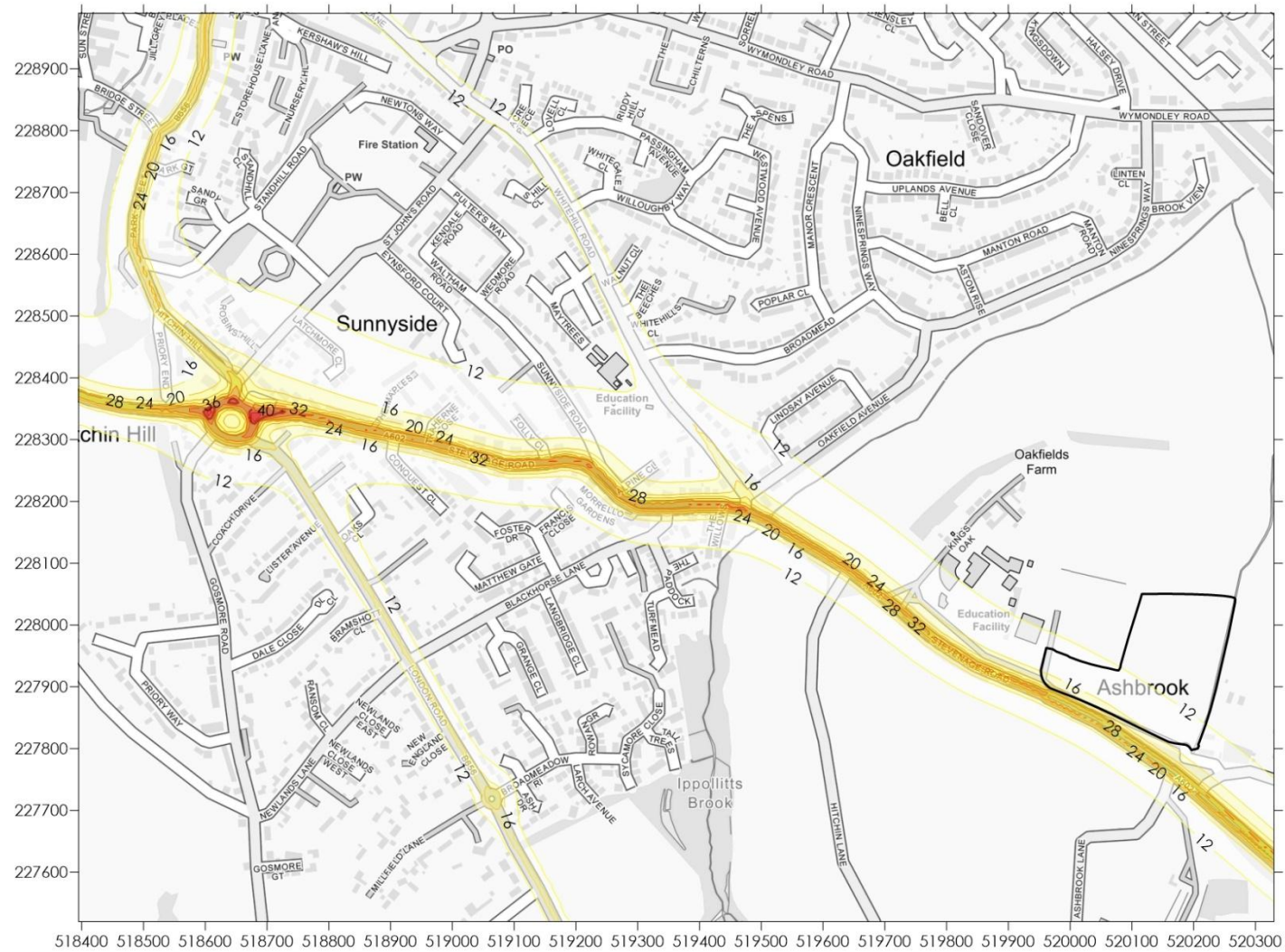
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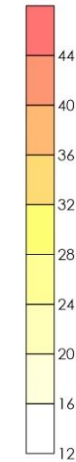
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Site Boundary



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

Title

Figure 5 - Predicted Annual Mean
 NO_2 Concentrations ($\mu\text{g}/\text{m}^3$)
Do-Something

Project

Air Quality Assessment
Stevenage Road, Hitchin

Project Reference

10117 / KPM 31263

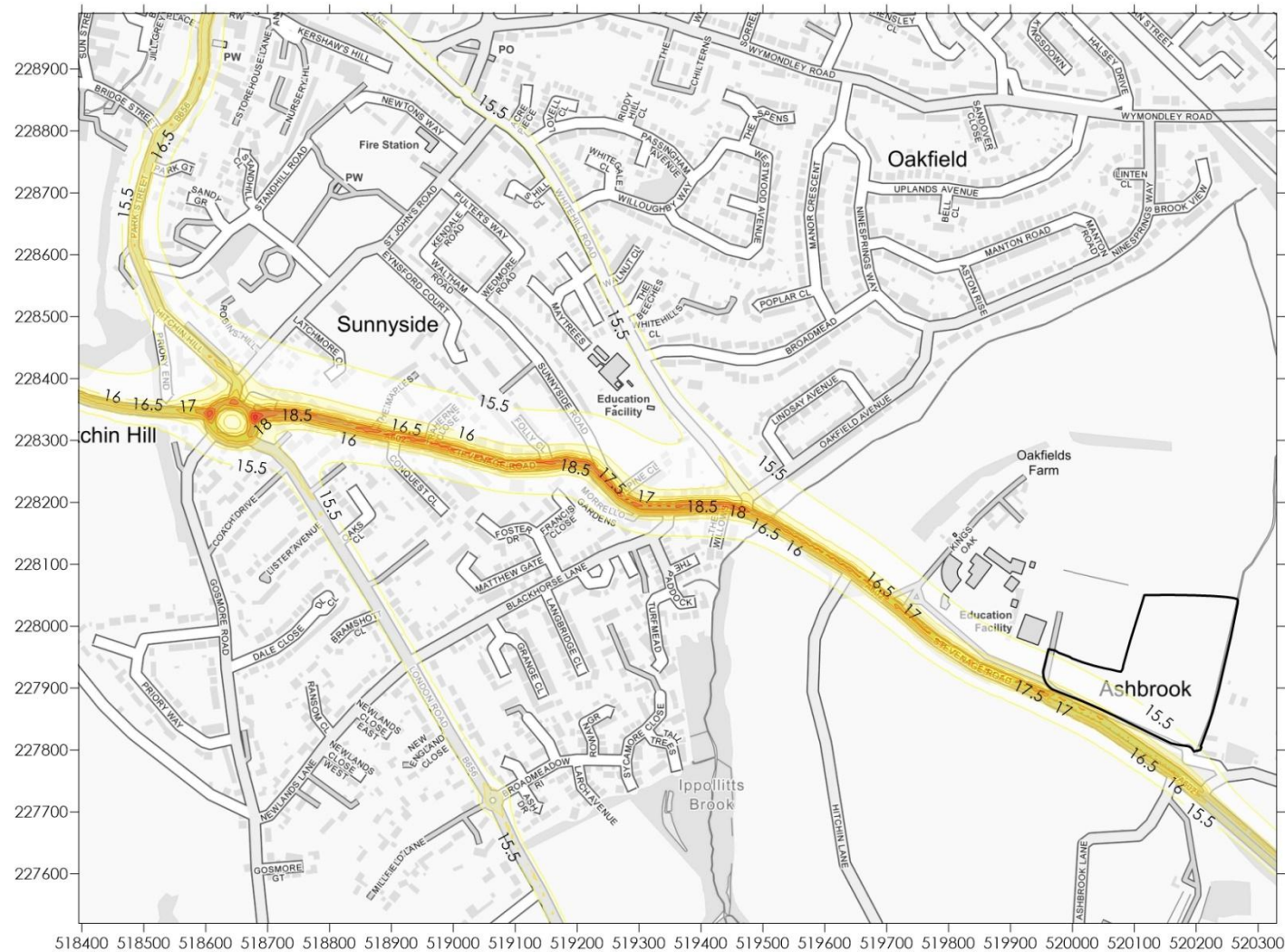
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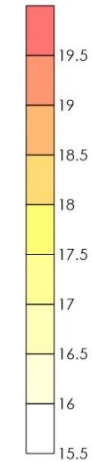
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Legend



Site Boundary



Annual Mean
PM₁₀
Concentration
(µg/m³)

Title

Figure 6 - Predicted Annual Mean
PM₁₀ Concentrations (µg/m³)
Do-Minimum

Project

Air Quality Assessment
Stevenage Road, Hitchin

Project Reference

10117 / KPM 31263

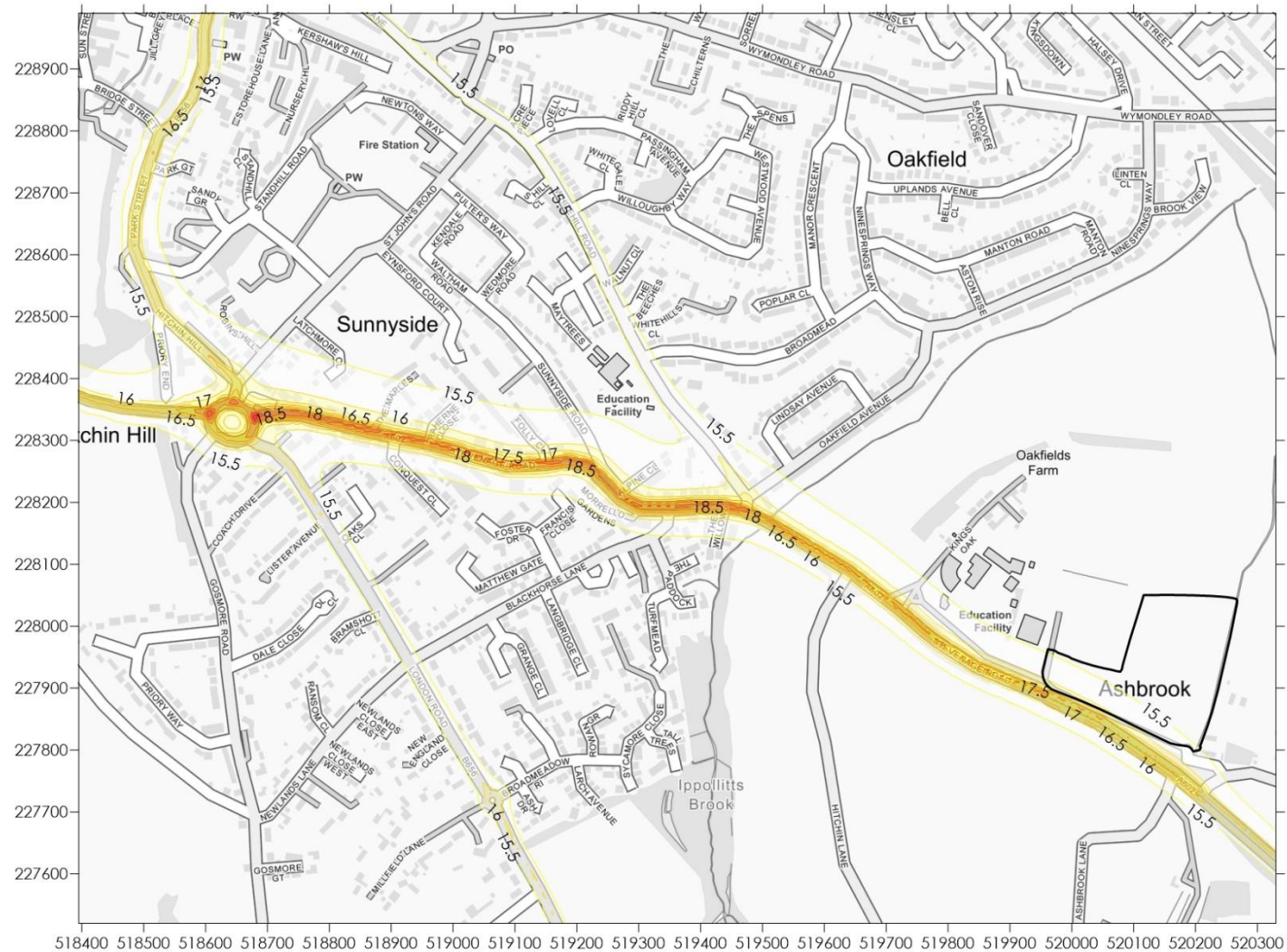
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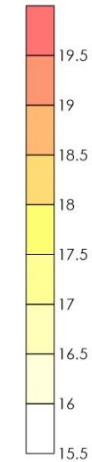
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Site Boundary



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

Title

Figure 7 - Predicted Annual Mean
 PM_{10} Concentrations ($\mu g/m^3$)
Do-Something

Project

Air Quality Assessment
Stevenage Road, Hitchin

Project Reference

10117 / KPM 31263

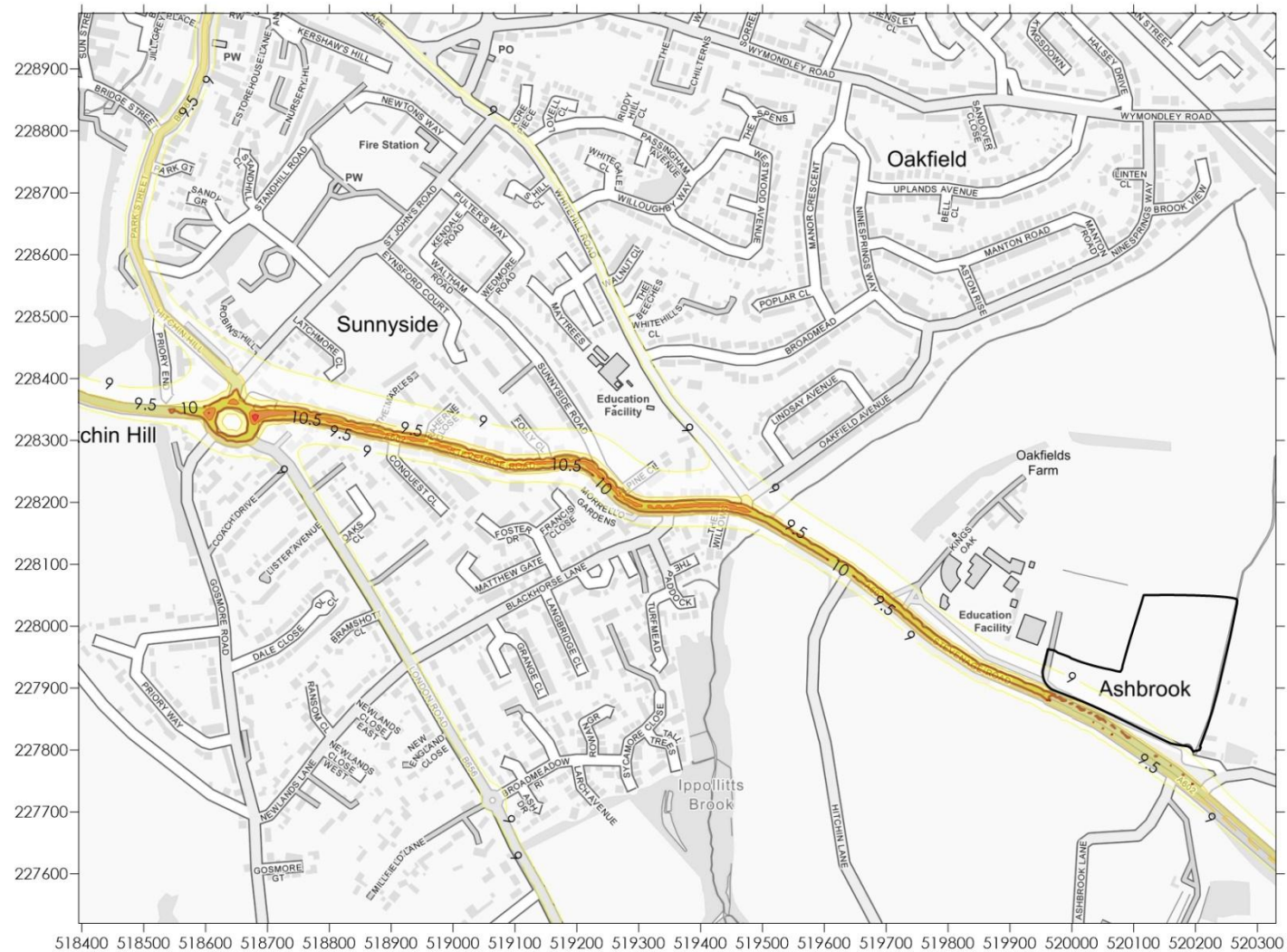
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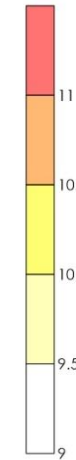
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Legend



Site Boundary



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

Title

Figure 8 - Predicted Annual Mean
 $PM_{2.5}$ Concentrations ($\mu g/m^3$)
Do-Minimum

Project

Air Quality Assessment
Stevenage Road, Hitchin

Project Reference

10117 / KPM 31263

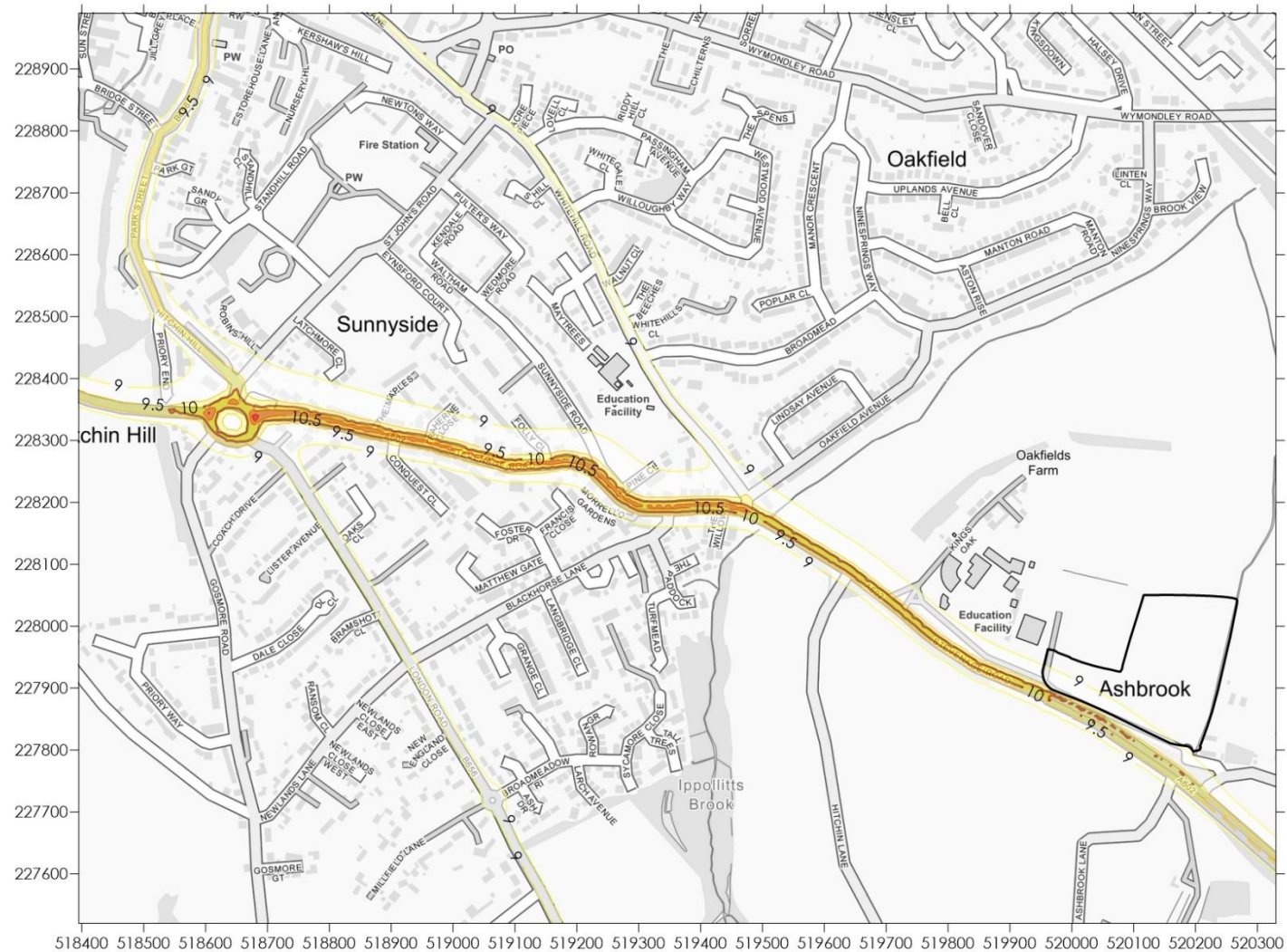
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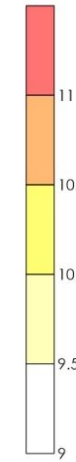
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Legend



Site Boundary



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

Title

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

Project

Air Quality Assessment
Stevenage Road, Hitchin

Project Reference

10117 / KPM 31263

Client

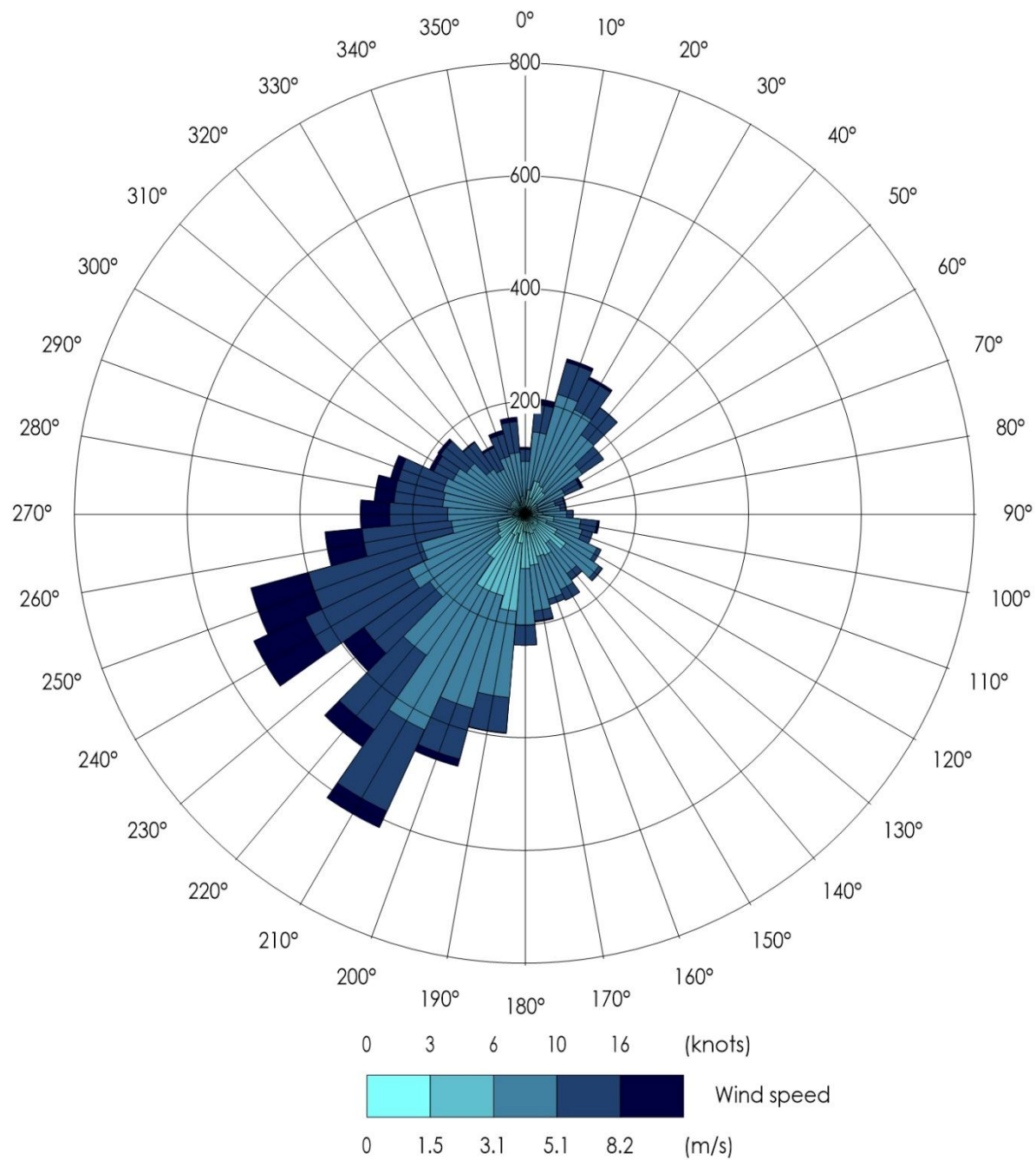
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Title
Figure 11 - Wind Rose of 2023 Luton
Airport Meteorological Data

Project
Air Quality Assessment
Stevenage Road, Hitchin

Project Reference
10117 / KPM 31263

Client
Bugler Homes

Appendix 1 - Assessment Input Data

Introduction

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

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.1.0.2). 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: 518395, 227520 to 520330, 228990. One cartesian grid was included within the model to product data suitable for contour plotting using the Surfer software package. The default intelligent grid spacing option was selected within ADMS-Roads in order to improve contour resolution within the vicinity of sources.

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 10 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Baseline traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as HDV proportion, was obtained from the Department for Transport (DfT)²¹. 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 2024. It should be noted that the DfT web tool is referenced in DEFRA guidance²² 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 opening year of the development 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.

Vehicle movements associated with the development were provided by the Transport Consultants for the project. These were added to the relevant links in order to determine future flows with the development in place.

Road parameters for input into the model were based on the following:

- Road widths were estimated from aerial photography and UK highway design standards;
- Vehicle speeds were estimated as an average for the relevant road link over the course of a 24-hour period;
- Vehicle speeds were determined following review of speed limits within the study extents, as well as congestion data available from GoogleMaps;

²¹ <https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints>.

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

- Vehicle speeds specific to slow phases were determined using the methodology outlined in the DEFRA guidance²³;
- Necessary adjustments to slow phase vehicle speeds were based upon congestion data available from GoogleMaps; and,
- The length for slow phases was derived using the approaching distance of 25m outlined in the DEFRA guidance²⁴, and adjusted accordingly based on aerial photography and congestion data available from GoogleMaps.

A summary of the traffic data used in the assessment is provided in in Table A1.1.

Table A1.1 Traffic Data

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Avg. Vehicle Speed (km/h)	Road Width (m)
		Verif.	2028 DM	2028 DS			
L1	Wymondley Bypass Eastbound (EB)	16,024	16,485	16,544	3.11	95	3.3
L2	Wymondley Bypass Westbound (WB)	15,328	15,769	15,828	3.35	95	4.7
L3	Wymondley Bypass	31,352	32,255	32,373	3.23	95	7.6
L4	Stevenage Road EB	16,024	16,485	16,551	3.11	60	5.1
L5	Stevenage Road WB	15,328	15,769	15,835	3.35	60	3.4
L6	Stevenage Road, east of Whitehill Road	31,352	32,255	32,386	3.23	60	7.8
L7	Stevenage Road, west of Whitehill Road	33,234	34,191	34,298	3.23	45	9.9
L8	Stevenage Road Slow Phase (SP)	33,234	34,191	34,298	3.23	20	15.2
L9	Hitchin Hill SP	13,214	13,595	13,648	3.47	20	13.3
L10	Park Street	13,214	13,595	13,648	3.47	45	6.7
L11	Park Way SP	27,627	28,423	28,476	3.00	20	15.1
L12	Park Way	27,627	28,423	28,476	3.00	80	6.9
L13	London Road SP	7,217	7,425	7,479	2.54	20	18.6
L14	London Road	7,217	7,425	7,479	2.54	45	9.7

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

²⁴ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Avg. Vehicle Speed (km/h)	Road Width (m)
		Verif.	2028 DM	2028 DS			
L15	London Road SP, north of Broadmeadow	7,217	7,425	7,479	2.54	20	11.2
L16	London Road SP, south of Broadmeadow	7,217	7,425	7,479	2.54	20	12.1
L17	London Road, south of Broadmeadow	7,217	7,425	7,479	2.54	45	6.8
L18	Whitehill Road SP, north of Stevenage Road	5,162	5,311	5,335	0.77	20	11.3
L19	Whitehill Road	5,162	5,311	5,335	0.77	45	9.8
L20	Whitehill Road SP, east of Park Street	5,162	5,311	5,335	0.77	20	12.1
R1	Stevenage Road roundabout	20,323	20,908	21,015	3.47	20	10.6
R2	London Road roundabout	7,217	7,425	7,452	2.54	20	9.7

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

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (EFT) (version 13.1). This has been produced by DEFRA and incorporates COPERT 5.8 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, 2023 emission factors were utilised in preference to the development opening year in order to provide robust model outputs. As predictions for 2023 were verified, it is considered the results are a robust indication of concentrations for the future year.

Road Gradients

There are a number of roads within the modelling extents that have varying gradients. This causes additional vehicle emissions, particularly from HDVs, due to increased engine load associated

with travelling up- and down-hill. Emission factors for links L7 and L10 were therefore adjusted using the relevant function in the EFT.

A summary of road gradient inputs used in the assessment is provided in Table A1.2.

Table A1.2 Road Gradient Inputs

Link	Road Gradient (%)
L7	3.4
L10	6.1

Meteorological Data

Meteorological data used in the assessment was taken from Luton Airport meteorological station over the period 1st January 2023 to 31st December 2023 (inclusive). Luton Airport is located at NGR: 511948, 221574, which is approximately 10.3km south-west of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 11 for a wind rose of utilised meteorological data.

Roughness Length

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

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 the meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'mixed urban/industrial'.

Background Concentrations

Background annual mean NO₂, PM₁₀ and PM_{2.5} concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the majority of the monitors. These are shown in Table A1.3.

Table A1.3 Background Pollutant Concentrations - Modelling Extents

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)
NO ₂	9.41
PM ₁₀	13.20
PM _{2.5}	7.60

The annual mean NO₂ concentration was chosen to represent concentrations throughout the dispersion modelling extents without the contribution from road vehicles as it was higher than the DEFRA background for the grid square containing the site, as shown in Table 15. Background PM₁₀ and PM_{2.5} values were chosen to provide continuity throughout the assessment.

Similarly to emission factors, background concentrations from 2023 were utilised in preference to the future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance²⁵.

Verification

The results from a dispersion model may differ from measures concentrations for a large number of reasons, including.

- Estimates of background concentrations;

²⁵ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

- 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 2023 using traffic data, meteorological data and monitoring results from this year.

Nitrogen Dioxide

Monitoring of NO₂ concentration was undertaken at 15 locations within the vicinity of roads included in the model during 2023. The results were obtained and the road contributions to total NO_x concentrations were calculated following the methodology contained within DEFRA guidance²⁶. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A1.4.

Table A1.4 NO_x Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
NH1	Stevenage Road	26.50	40.17
S2/NH45	Stevenage Road A	25.30	36.93
S10/NH103	Westbrook Court	27.90	44.04
S15/NH87	11 Stevenage Road	26.20	39.35
S17/NH89	London Road	15.00	11.92
S18/NH91	BP Garage Stevenage Road	19.50	22.29
S19/NH92	Stevenage Road (Griffin)	27.00	41.54
S23/NH116	6 Horseshoe, Park Street	23.10	31.19

²⁶ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
S29/NH104	Dower Court (A), Stevenage Road	18.00	18.75
S30/NH105	94-98 Stevenage Road	26.40	39.89
S31/NH106	Morello Gardens, Stevenage Road	21.00	25.93
S32/NH107	Whitehill Road	18.10	18.98
S33, S34, S35/ NH110, NH111, NH112	Stevenage Road, AQ Analyser 3	35.30	66.52
S39	38 Stevenage Road	24.50	34.82
S41/NH82, S38	BP Garage Stevenage Road	22.90	30.68

The annual mean road NO_x concentrations predicted from the dispersion model and the 2023 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.5.

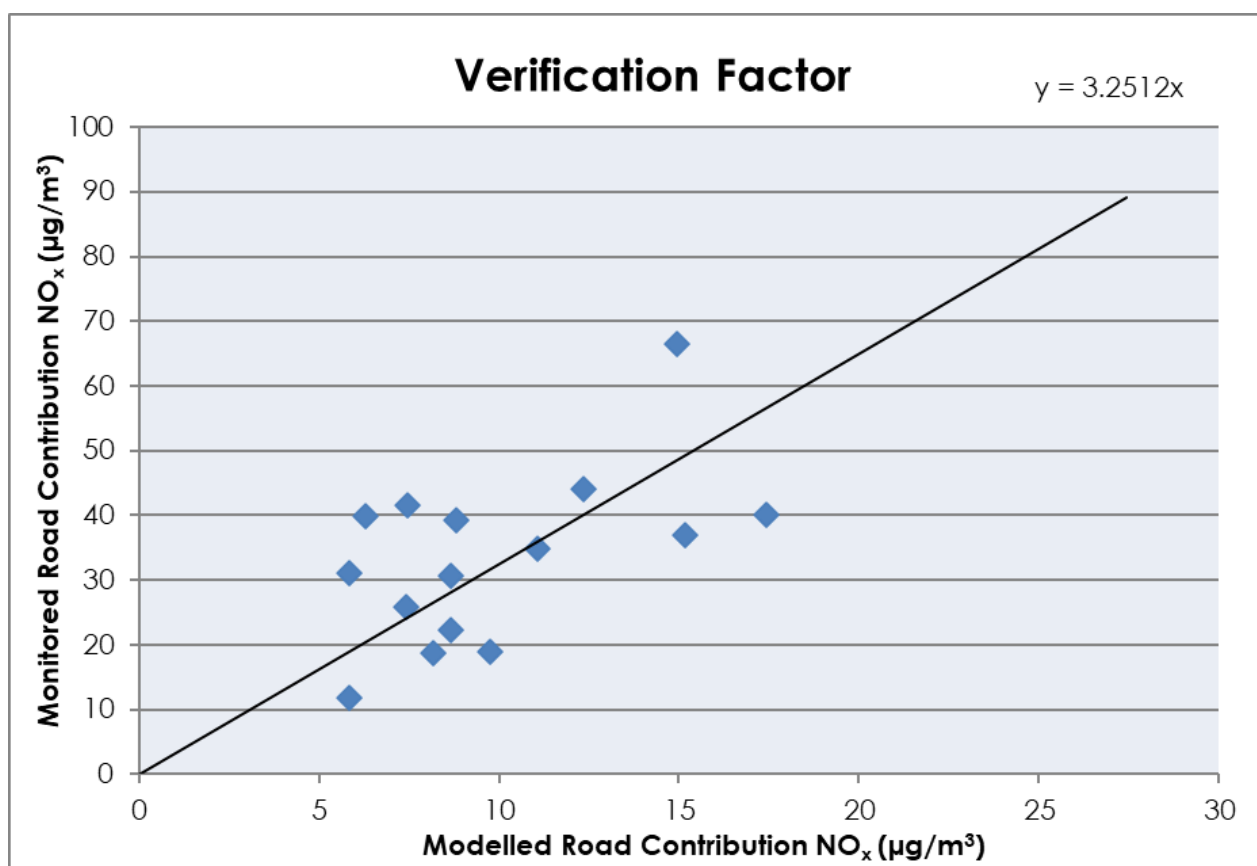
Table A1.5 NO_x Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
NH1	Stevenage Road	40.17	17.43
S2/NH45	Stevenage Road A	36.93	15.15
S10/NH103	Westbrook Court	44.04	12.37
S15/NH87	11 Stevenage Road	39.35	8.80
S17/NH89	London Road	11.92	5.86
S18/NH91	BP Garage Stevenage Road	22.29	8.66
S19/NH92	Stevenage Road (Griffin)	41.54	7.44
S23/NH116	6 Horseshoe, Park Street	31.19	5.86
S29/NH104	Dower Court (A), Stevenage Road	18.75	8.16
S30/NH105	94-98 Stevenage Road	39.89	6.28
S31/NH106	Morello Gardens, Stevenage Road	25.93	7.40
S32/NH107	Whitehill Road	18.98	9.76

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
S33, S34, S35/ NH110, NH111, NH112	Stevenage Road, AQ Analyser 3	66.52	14.94
S39	38 Stevenage Road	34.82	11.08
S41/NH82, S38	BP Garage Stevenage Road	30.68	8.66

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 3.2512 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



Further analysis of model performance has been completed in order to provide additional confidence in assessment predictions. As such, the Root Mean Squared Error (RMSE) has been calculated to define the average error or uncertainty of the mode.

In accordance with DEFRA guidance²⁷, if the RMSE value is higher than +/-25% of the AQO being assessed, it is recommended that the model inputs and verification is revisited in order to make improvements. The annual mean AQO of relevance to the assessment is 40µg/m³. As such, an RMSE value of +/-10µg/m³ is required in order to have confidence in the predicted values. The RMSE calculated for the study is 4.4µg/m³, which is within the stated limits.

As such, the model is considered to be performing to an acceptable standard in line with the applicable guidance²⁸.

Particulate Matter

Monitoring of PM₁₀ was undertaken at one location within the modelling extents during 2023. The monitored annual mean PM₁₀ concentration and modelled PM₁₀ concentration is shown in Table A1.6.

Table A1.6 PM₁₀ Verification - Modelling Result

Monitoring Location		Calculated Road PM ₁₀ Concentration (µg/m ³)	Modelled Road PM ₁₀ Concentration (µg/m ³)
NH2	Stevenage Road PM	15.4	17.7

The monitored and modelled PM₁₀ concentrations were compared to calculate the associated ratio. This indicated a verification factor of 1.1459 was required to be applied to all modelling results.

Monitoring of PM_{2.5} concentrations is not undertaken within the assessment extents in 2023. The PM₁₀ verification factor was therefore used to adjust model predictions of these species in lieu of more accurate data in accordance with DEFRA guidance²⁹.

²⁷ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

²⁸ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

²⁹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Appendix 2 - Curricula Vitae

KEY EXPERIENCE:

Alex is an Associate Director within Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production of Air Quality Chapters to support large scale EIA developments for residential, mixed use and commercial land uses.
- 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.
- Undertaken dispersion modelling utilising ADMS and BREEZE AERMOD to assess air quality impacts of peak power plants and various industrial processes for planning and permit applications.
- Advanced canyon modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Production of site-specific construction environmental management plans.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Provided technical advice during a public debate on an odour nuisance issue.
- Qualitative and quantitative odour impact assessments determining the impact of odorous emissions on sensitive receptors
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.

SELECT PROJECTS SUMMARY:

Washingley Farm, Huntingdon

Air Quality Assessment forming part of an EIA for a proposed 500 residential unit development in Huntingdon. The assessment involved a construction impact assessment of fugitive dust emissions and an impact assessment of the operation of the development; this included increases in road traffic volume potentially impacting on local air quality. A cumulative impact assessment of relevant large scale committed developments in the area was key to the chapter.

Freightmaster Estate, Rainham

Air Quality Assessment for redevelopment of an industrial/storage park including the assessment of road transport emissions on an adjacent ecological designated site. Following a request from the local authority, a detailed review of the predicted impacts on the ecological site was provided.

Braintree Waste Transfer Station

Odour Impact Assessment compiled following comments from the Waste Planning Authority for a Waste Transfer Centre in Braintree. Odour concentrations were predicted at local sensitive receptors through a dispersion modelling assessment.

A46 Binley junction Improvement

Project managing a multi-disciplinary due diligence assessment of the A46 Binley Junction. Undertook passive air quality monitoring survey to support findings of Environmental Assessment Report (EAR).

Medway Industrial Estate

An Air Quality Assessment was required to determine the impacts of a proposed gas-fired engine Short Term Operating Reserve (STOR) site, located within an industrial estate. An iterative modelling process was undertaken in order to establish and agree a stack height with the Local Planning Authority. The industrial estate was located within a former quarry, thus meaning the ground level of the site was significantly below ground level (~9-16m). Through consultation with the engineers for the development several designs were discussed and modelled until a suitable solution was found.

Green Lanes, Haringey

A detailed Air Quality Assessment including dispersion modelling of both road transport emissions and energy centre emissions was provided. The energy centre included a fan assisted flue dilution system emitting at a low level in comparison with the adjacent residential blocks as part of the development. Calculations determined the relevant discharge velocity required in order to not produce significant effects on the residential receptors.

Fulham Town Hall, London

An Air Quality Assessment was provided for the proposed development converting Fulham Town Hall from the current usage into a hotel with business and leisure functions. Street canyon modelling was undertaken and input into the ventilation strategy and design provided in order to satisfy planning criteria due to high levels of air pollutant concentrations predicted.

KEY EXPERIENCE:

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

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads and ADMS-6. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Advanced Canyon Modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Odour surveys to assess amenity of suitability of sites for potential future development for residential use.
- Production of Air Quality Neutral Assessment in accordance with The London Plan.
- Measurement and assessment of indoor air quality in support of BREEAM accreditation. She has conducted Total Volatile Organic Compound (TVOC) and formaldehyde monitoring at numerous commercial developments throughout the UK in pursuit of the relevant credit specified under BREEAM category Hea 02 'Indoor Air Quality'.

SELECT PROJECTS SUMMARY:

Princess of Wales Hospital, Ely

Production of an Air Quality Assessment in support of the installation of an emergency generator unit located at Princess of Wales Hospital, Ely. Dispersion modelling of combustion emissions using ADMS-6 was undertaken in order to predict impacts at sensitive receptors. The results indicated pollutant levels as a result of the operation of the plant were below the relevant AQOs at all locations within the vicinity of the installation. Mitigation was therefore not required.

West Town Road, Avonmouth

Air Quality Assessment in support of a Bio-Compressed Natural Gas fuelling station on land off West Town Road, Avonmouth. Dispersion modelling was undertaken to determine potential changes in pollution levels as a result of emissions from the installation and consider potential impacts at nearby sensitive receptor locations. The overall effects of the development were predicted to be not significant.

Kent Street, Birmingham

Production of an Air Quality Assessment in support of the construction of a residential development across eight blocks. This development was located just outside the boundary of the Birmingham Clean Air Zone (CAZ). ADMS-Roads dispersion modelling was undertaken to determine the exposure of future residents to elevated pollutant concentrations. The results indicated that concentrations were below the relevant AQOs and Interim Target.

Nearsden Lane, London

Air Quality Neutral Assessment in support of the construction of a ten-storey building, with 74 commercial kitchen units. The assessment was carried out in accordance with the London Plan requirements to ensure proposals did not lead to further deterioration of existing air quality. Following discussions and implementation of the identified strategies, compliance with the London Plan was achieved.

Moss Side, Manchester

Odour Assessment in support of a residential development within Moss-Side, Manchester. The proposals were located in close proximity to the Heineken UK Limited Brewery. As such, the Local Authority raised concerns that odour emissions may cause loss of amenity to future residents. A programme of Field Odour Surveys was undertaken to assess odour impacts from said premises. Results indicated odour effects to the site did not represent a constraint to planning consent.

Arax Euston House, London

Indoor Air Quality Monitoring in support of the construction of a redeveloped office space. The scheme was registered to pursue certification through the BREEAM 2014 standard. As such, Indoor Air Quality Monitoring was undertaken at four locations to determine conditions within the building and identify any issues. The results indicated concentrations of TVOCs and formaldehyde were below the BREEAM criteria at all positions.