

Air Quality Assessment

Land at Pound Farm, Ickleford

Client: Bugler Homes Ltd

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Executive Summary

Redmore Environmental Ltd was commissioned by KP Monitoring Ltd on behalf of Bugler Homes Ltd to undertake an Air Quality Assessment in support of a residential-led mixed-use development on Land at Pound Farm, Ickleford, SG5 3RS.

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;
- Assess risk of future users exposure to any existing air quality issues; 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.

The results of the assessment also demonstrated that predicted pollution levels were below the relevant criteria across the development. As such, the site is considered suitable for the proposed use from an air quality perspective and mitigation is not required.

The North Hertfordshire Air Quality Planning Guidance was also considered within the assessment. Potential emissions from the proposals were calculated in accordance with the document. The results were used to determine the appropriate level of mitigation required for the scheme. 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 KP Monitoring Ltd on behalf of Bugler Homes Ltd to undertake an Air Quality Assessment in support of a residential-led mixed-use development on Land at Pound Farm, Ickleford, SG5 3RS.

1.2 Site Location and Context

- 1.2.1 The site is located on Land at Pound Farm, Ickleford, SG5 3RS, at approximate National Grid Reference (NGR): 517480, 231600. 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 a hybrid planning application for a mixed-use development to provide a total of up to 230 dwellings, a residential care home (Use Class C2), an Independent Special School (ISS) and new sports pitch, with access from Bedford Road, landscaping, parking and Sustainable Drainage Systems (SuDS). The application will be brought forward in two phases as follows:
- Phase 1 - Application for full planning permission for the erection of 100 dwellings, an ISS, new sports pitch and associated parking, landscaping, open space and SuDS; and,
 - Phase 2 - An outline application on the remaining part of the site for the erection of up to 130 dwellings, a residential care home (Use Class C2) and associated works with access from Bedford Road (all matters reserved apart from access).

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;
- Assess risk of future users exposure to any existing air quality issues; 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 2025² was published in December 2025, providing long term and Interim Targets in order to reduce population exposure to PM_{2.5}. The Concentration Target for 2040 was adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

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

² Environmental Improvement Plan 2025, DEFRA, 2025.

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}	10 ^(a)	Annual mean
	10 ^(b)	Annual mean

Note: (a) Interim Target to be achieved by 2030.

(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. 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 NHDC adopted the 'Air Quality Planning Guidance Document'⁷ in October 2018. The purpose of the document is to facilitate sustainable development by helping to achieve the best possible public health protection outcomes, with regards to air quality.
- 2.6.3 Consideration was made to the above policy and guidance document throughout the assessment.

⁷ NHDC Air Quality Planning Guidance Document, NHDC, 2018.

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 V2.2'⁸.

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.

⁸ 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 guidance⁹ 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, as well as expose future users to any existing air quality issues. 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 2030 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2030 should the proposals be completed).

⁹ 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.

Potential Development Impacts

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 guidance¹⁰ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance¹¹ 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'¹². 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

¹⁰ LA 105: Air Quality, National Highways, 2024.

¹¹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

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

the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document¹³ 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 guidance¹⁴ suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

Potential Future Exposure

3.3.9 The proposals have the potential to expose future residents to any existing air quality issues. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations across the development site, detailed dispersion modelling was undertaken. The results were subsequently compared with the relevant AQOs and Concentration Target to determine any potential areas of exceedence and associated constraints to the proposed land use. Reference should be made to Appendix 1 for a full description of the assessment input data.

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

¹⁴ 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 2 Payne's Park, Hitchin - One residential property located adjacent to the Paynes Park Roundabout. The south-east façade of which is exposed to nitrogen dioxide concentrations above the annual mean Air Quality Objective".

- 4.2.2 The proposals are located approximately 2.4km north 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.
- 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 its 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)'¹⁵, are shown in Table 10.

¹⁵ 2024 Air Quality ASR, NHDC, 2024.

Table 10 Monitoring Results - Annual Mean NO₂

Monitoring Site		Monitored Annual Mean NO ₂ Concentration (µg/m ³)		
		2021	2022	2023
S12/NH131	Turnpike Lane, Ickleford	28.9	29.1	15.4
S36/NH114	Old Park Road, Hitchin	18.6	21.8	20.7
S6/NH63	Library, Hitchin	24.1	26.6	24.5
S13/NH82	Upper Tilehouse Street, nr roundabout	21.7	25.9	22.7
S20/NH93	Park Way, Hitchin	- (a)	31.1	26.9
S11/NH77	Upper Tilehouse Street, Hitchin	26.9	29.5	27.2
S21/NH94	Offley Road, Hitchin	20.9	24.0	18.6
S22/NH95	Pirton Road, Hitchin	19.5	22.9	20.7

Note: (a) No recorded concentration.

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. Reference should be made to Figure 2 for a map of the survey positions in proximity to the site and to Figure 3 for survey positions relevant to the AQMA.

4.3.3 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 IAQM¹⁶, 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."

4.3.4 NHDC do not undertake PM₁₀ or PM_{2.5} monitoring in the vicinity of the site.

¹⁶ Use of 2020 and 2021 Monitoring Datasets - IAQM Position Statement V1.1, IAQM, 2023.

4.4 **Background Pollutant Concentrations**

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 517500, 231500. Data for this location was downloaded from the DEFRA website¹⁷ for the purpose of the assessment and is summarised in Table 11.

Table 11 Background Pollutant Concentration Predictions

Pollutant	Predicted 2025 Background Annual Mean Pollutant Concentration (µg/m ³)		
	2023	2025	2030
NO ₂	7.72	7.34	6.26
PM ₁₀	13.51	13.31	12.84
PM _{2.5}	7.24	7.06	6.66

4.4.2 As shown in Table 11, 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 12.

¹⁷ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021>.

Table 12 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	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 13.

Table 13 Trackout Dust Sensitive Receptors

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

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 14.

Table 14 Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Bedford Road	517755.2	231280.0
R2	Residential - Turnpike Lane	517787.0	231287.6
R3	Residential - Bearton Road	517899.6	230125.4
R4	Residential - Lancaster Avenue	517935.5	229964.5
R5	Residential - Bedford Road	517954.8	229748.2
R6	Education - Wilshire-Dacre Junior Academy	518288.1	229770.6
R7	Residential - Old Park Road	518036.8	229428.5
R8	Health - Hampden House	518192.7	229408.2
R9	Residential - Poppy House	518321.6	229250.7
R10	Residential - Payne's Park	518187.9	229082.3
R11	Residential - Chancery Place	518139.7	229099.2
R12	Residential - Park Way	518129.6	229056.5
R13	Residential - Upper Tilehouse Street	517923.1	229006.8

4.5.7 Reference should be made to Figure 4 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 greater than 110,000m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **large**.

Construction

- 5.3.2 Due to the size of the development, the total building volume is likely to be greater than 75,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

Trackout

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

5.4 Step 2b - Define the Sensitivity of the Area

Dust Soiling

- 5.4.1 Table 12 shows that there are between 10 and 100 **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 **high**.
- 5.4.2 Table 13 shows that there are between 10 and 100 **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 **high**.

Human Health

- 5.4.3 As shown in Table 11, the annual mean PM₁₀ background concentration at the site is 13.31µg/m³. As shown in Table 6, where the background annual mean PM₁₀ concentration is below 24µg/m³ and there are between 10 and 100 **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 10 and 100 **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 15.

Table 15 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	Large	High	High
	Construction	Large	High	High
	Trackout	Large	High	High
Human Health	Earthworks	Large	Low	Low
	Construction	Large	Low	Low
	Trackout	Large	Low	Low

5.5.2 As indicated in Table 15, the potential risk of dust soiling is **high** 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 guidance¹⁸ provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 16. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the LA.

Table 16 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 • Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised
Monitoring	• Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked • 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

¹⁸ 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 • Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials • Implement a Travel Plan that supports and encourages sustainable travel
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires or burning of waste materials
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable • Only remove the cover in small areas during work and not all at once
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stores in silos

Issue	Control Measure
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 • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable • Record all inspections of haul routes and any subsequent action in a site log book • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned • 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 • Access gates to be located at least 10 m from receptors where possible

5.7 **Step 4 - Determine Significant Effects**

5.7.1 Assuming the relevant mitigation measures outlined in Table 16 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁹.

¹⁹ 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;
- 2030 - DM; and,
- 2030 - 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 2030 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 2030 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 17.

Table 17 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bedford Road	12.08	12.40	0.32
R2	Residential - Turnpike Lane	13.71	14.10	0.39
R3	Residential - Bearton Road	19.11	19.74	0.63
R4	Residential - Lancaster Avenue	15.90	16.37	0.47
R5	Residential - Bedford Road	15.89	16.17	0.28
R6	Education - Wilshire-Dacre Junior Academy	11.79	11.89	0.10
R7	Residential - Old Park Road	14.74	14.90	0.16
R8	Health - Hampden House	12.61	12.71	0.10
R9	Residential - Poppy House	14.23	14.36	0.13
R10	Residential - Payne's Park	18.19	18.39	0.20
R11	Residential - Chancery Place	25.01	25.29	0.28
R12	Residential - Park Way	23.95	24.15	0.20
R13	Residential - Upper Tilehouse Street	18.21	18.33	0.12

6.2.2 As indicated in Table 17, 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, 5, 6 and 7 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 18.

Table 18 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bedford Road	13.23	13.32	0.09
R2	Residential - Turnpike Lane	13.66	13.77	0.11
R3	Residential - Bearton Road	15.12	15.31	0.19
R4	Residential - Lancaster Avenue	14.30	14.44	0.14
R5	Residential - Bedford Road	14.28	14.36	0.08
R6	Education - Wilshire-Dacre Junior Academy	13.35	13.38	0.03
R7	Residential - Old Park Road	13.92	13.96	0.04
R8	Health - Hampden House	13.55	13.58	0.03
R9	Residential - Poppy House	14.10	14.14	0.04
R10	Residential - Payne's Park	14.87	14.93	0.06
R11	Residential - Chancery Place	16.86	16.95	0.09
R12	Residential - Park Way	16.58	16.65	0.07
R13	Residential - Upper Tilehouse Street	14.80	14.83	0.03

6.2.5 As indicated in Table 18, 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 8, 9, 10 and 11 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 19.

Table 19 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bedford Road	7.76	7.81	0.05
R2	Residential - Turnpike Lane	7.99	8.05	0.06
R3	Residential - Bearton Road	8.78	8.88	0.10
R4	Residential - Lancaster Avenue	8.34	8.41	0.07
R5	Residential - Bedford Road	8.32	8.37	0.04
R6	Education - Wilshire-Dacre Junior Academy	7.81	7.83	0.02
R7	Residential - Old Park Road	8.13	8.15	0.02
R8	Health - Hampden House	7.93	7.94	0.02
R9	Residential - Poppy House	8.22	8.25	0.02
R10	Residential - Payne's Park	8.65	8.68	0.03
R11	Residential - Chancery Place	9.73	9.78	0.05
R12	Residential - Park Way	9.58	9.61	0.04
R13	Residential - Upper Tilehouse Street	8.61	8.63	0.02

6.2.8 As indicated in Table 19, 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 12, 13, 14 and 15 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 20.

Table 20 Predicted Impacts - Annual Mean NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Bedford Road	Below 75% of AQO	1	Negligible
R2	Residential - Turnpike Lane	Below 75% of AQO	1	Negligible
R3	Residential - Bearton Road	Below 75% of AQO	2 - 5	Negligible
R4	Residential - Lancaster Avenue	Below 75% of AQO	1	Negligible
R5	Residential - Bedford Road	Below 75% of AQO	1	Negligible
R6	Education - Wilshire-Dacre Junior Academy	Below 75% of AQO	0	Negligible
R7	Residential - Old Park Road	Below 75% of AQO	0	Negligible
R8	Health - Hampden House	Below 75% of AQO	0	Negligible
R9	Residential - Poppy House	Below 75% of AQO	0	Negligible
R10	Residential - Payne's Park	Below 75% of AQO	1	Negligible
R11	Residential - Chancery Place	Below 75% of AQO	1	Negligible
R12	Residential - Park Way	Below 75% of AQO	1	Negligible
R13	Residential - Upper Tilehouse Street	Below 75% of AQO	0	Negligible

6.3.2 As indicated in Table 20, 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 21.

Table 21 Predicted Impacts - Annual Mean PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Bedford Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R2	Residential - Turnpike Lane	Below 75% of AQO	0	Negligible
R3	Residential - Bearton Road	Below 75% of AQO	0	Negligible
R4	Residential - Lancaster Avenue	Below 75% of AQO	0	Negligible
R5	Residential - Bedford Road	Below 75% of AQO	0	Negligible
R6	Education - Wilshire-Dacre Junior Academy	Below 75% of AQO	0	Negligible
R7	Residential - Old Park Road	Below 75% of AQO	0	Negligible
R8	Health - Hampden House	Below 75% of AQO	0	Negligible
R9	Residential - Poppy House	Below 75% of AQO	0	Negligible
R10	Residential - Payne's Park	Below 75% of AQO	0	Negligible
R11	Residential - Chancery Place	Below 75% of AQO	0	Negligible
R12	Residential - Park Way	Below 75% of AQO	0	Negligible
R13	Residential - Upper Tilehouse Street	Below 75% of AQO	0	Negligible

6.3.4 As indicated in Table 21, 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 22.

Table 22 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 - Bedford Road	76 - 94% of Concentration Target	0	Negligible
R2	Residential - Turnpike Lane	76 - 94% of Concentration Target	1	Negligible

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of Concentration Target (%)	Impact Significance
R3	Residential - Bearton Road	76 - 94% of Concentration Target	1	Negligible
R4	Residential - Lancaster Avenue	76 - 94% of Concentration Target	1	Negligible
R5	Residential - Bedford Road	76 - 94% of Concentration Target	0	Negligible
R6	Education - Wilshire-Dacre Junior Academy	76 - 94% of Concentration Target	0	Negligible
R7	Residential - Old Park Road	76 - 94% of Concentration Target	0	Negligible
R8	Health - Hampden House	76 - 94% of Concentration Target	0	Negligible
R9	Residential - Poppy House	76 - 94% of Concentration Target	0	Negligible
R10	Residential - Payne's Park	76 - 94% of Concentration Target	0	Negligible
R11	Residential - Chancery Place	95 - 102% of Concentration Target	0	Negligible
R12	Residential - Park Way	95 - 102% of Concentration Target	0	Negligible
R13	Residential - Upper Tilehouse Street	76 - 94% of Concentration Target	0	Negligible

6.3.6 As indicated in Table 22, 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 Potential Future Exposure

6.4.1 The proposed development has the potential to cause the exposure of future residents, staff and students to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions at the site. Reference should be made to Figures 6, 10 and 14 for graphical representations of annual mean NO₂, PM₁₀ and PM_{2.5} concentrations.

- 6.4.2 As shown in Figure 6, annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ across the development. The maximum level was 13.08µg/m³.
- 6.4.3 As shown in Figure 10, annual mean PM₁₀ concentrations were predicted to be below the AQO of 40µg/m³ across the development. The maximum level was 13.75µg/m³.
- 6.4.4 As shown in Figure 14, annual mean PM_{2.5} concentrations were predicted to be below the Concentration Target of 10µg/m³ across the development. The maximum level was 8.04µg/m³.
- 6.4.5 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the AQOs and Concentration Target. As such, the site is considered suitable for the proposed use from an air quality perspective.

6.5 Overall Impact Significance

- 6.5.1 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 23.

Table 23 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

Guidance	Comment
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	It was assumed that vehicle exhaust emission rates 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

6.5.2 The IAQM guidance²⁰ 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.

6.6 Interim Planning Guidance for PM_{2.5}

6.6.1 Interim Planning Guidance²¹ 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 24, along with the development response.

Table 24 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	The site is located in a rural area to the west of Ickleford and north of Hitchin. Residential properties are located to the south of the site. However impacts associated with the development are predicted to be not significant, as set out in Section 6.3 The residential and school development will be set back from major road sources by approximately 20m and future residents are unlikely to be exposed to elevated PM_{2.5} concentrations, as shown in Figure 14 As outlined in Table 16, 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

²⁰ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

²¹ <https://uk-air.defra.gov.uk/pm25targets/planning>.

Question	Response
• Site proximity to pollution sources and the impact of these on users of the development • Exposure and emissions during both construction and in-use	
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 and the proposed SEN School will be set back from Bedford Road and associated road vehicle exhaust emissions by approximately 20m • A number of trees will be planted in between proposed dwellings and Bedford Road providing a natural barrier to road exhaust emissions associated with Bedford Road 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 an Electric Vehicle charging point per dwelling to encourage the use of low emission vehicles • Air Source Heat Pumps (ASHPs) will be utilised 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

6.6.2 Based on the responses provided in Table 24 and the results of the assessment, as outlined in Sections 5.7, 6.3 and 6.4, 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 NORTH HERTFORDSHIRE AIR QUALITY PLANNING GUIDANCE DOCUMENT

7.1 Development Classification

7.1.1 The 'NHDC Air Quality Planning Guidance Document'²² provides a methodology for determining the scale of a development as minor, medium or major and the required air quality mitigation for the relevant banding. Review of the relevant criteria indicated the proposals were classified as **major** due to the following:

- The proposed development includes more than 50 residential dwellings; and,
- The scheme is predicted to cause a change in LDV flows of more than 100 Annual Average Daily Traffic (AADT) within an AQMA and more than 500 AADT outside an AQMA.

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

7.2 Damage Costs Assessment

7.2.1 The guidance²³ sets out a Damage Cost Assessment methodology in order to assess the local emissions from a development and determine the appropriate level of mitigation required to help reduce the potential effect on health and/or the local environment.

7.2.2 The first step of the damage cost assessment is to undertake a calculation to identify the monetary value of predicted emissions from the proposals. This utilises the Emissions Factor Toolkit (EFT) to calculate the amount of transport related pollutant emissions the development is likely to produce. The output is then multiplied by the Interdepartmental Group on Costs and Benefits damage costs for the key pollutants oxides of nitrogen (NO_x) and PM_{2.5} and finally multiplied by 5 to provide a five-year exposure cost value. This is the value of mitigation that is expected to be spent on measures to reduce the impact of the Proposed Development. This has been summarised in the following equation:

²² NHDC Air Quality Planning Guidance Document, NHC, 2018.

²³ NHDC Air Quality Planning Guidance Document, NHC, 2018.

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

7.2.3 It should be noted that the calculation has been undertaken using the most recent damage costs released by DEFRA in 2023²⁴.

7.2.4 The input data values used in the assessment are shown in Table 25.

Table 25 Damage Cost Assessment - Inputs

Data	Value
Daily Vehicle Movements Produced by Development	1,262
HDV Proportion (%)	0
Average Speed (km/h)	50
Average Trip Length (km)	10

7.2.5 The projected yearly emissions and damage cost price for each of the five years from opening year are shown in Table 26.

Table 26 Damage Costs - Projected Emissions and Damage Cost Prices

Data	Value				
	2029	2030	2032	2033	2034
NO _x Output (tonnes/year) ^(a)	0.4246	0.3580	0.3006	0.2523	0.2133
PM _{2.5} Output (tonnes/year) ^(a)	0.0764	0.0756	0.0749	0.0742	0.0737
NO _x Damage Costs (£/tonne) ^(b)	8,002	8,002	8,002	8,002	8,002
PM _{2.5} Damage Costs (£/tonne) ^(b)	55,269	55,269	55,269	55,269	55,269

Note: (a) Emission Factor calculated from EFT Version 13.1

(b) Road Transport Urban Small Central Damage Cost adjusted to 2025 Base Year

7.2.6 The calculation is shown in Table 27.

²⁴ Air Quality Appraisal: Damage Cost Guidance, DEFRA, 2023.

Table 27 Damage Cost - Calculation

Data	Value (£)				
	2030	2031	2032	2033	2034
Annual Cost of NO _x Emissions	3,397	2,823	2,334	1,931	1,608
Annual Cost of PM _{2.5} Emissions	4,225	4,117	4,017	3,924	3,837
Total Annual Exposure Cost Value	7,622	6,939	6,351	5,854	5,445
Total Cumulative Five-Year Exposure Cost Value	32,212				

7.3 Mitigation

7.3.1 As shown in Table 27, the calculation determined the development should include mitigation measures to reduce air quality impacts associated with road traffic emissions equal to £32,212.

7.3.2 The guidance²⁵ provides a number of mitigation options that should be considered for inclusion within developments. These were reviewed and those to be incorporated within the proposals include the following:

- Provision of Electric Vehicle (EV) charging points for all dwellings;
- Provision of secure cycle storage within each property and SEN School; and,
- Each dwelling to utilise ASHP.

7.3.3 Costs of the above measures were not available at the time of reporting. However, the proposed initiatives are considered sufficient to minimise air quality impacts from a development of this scale. Costs associated with the mitigation measures can be requested to NHDC through a planning condition, if deemed necessary.

²⁵ NHDC Air Quality Planning Guidance Document, NHC, 2018.

8.0 CONCLUSION

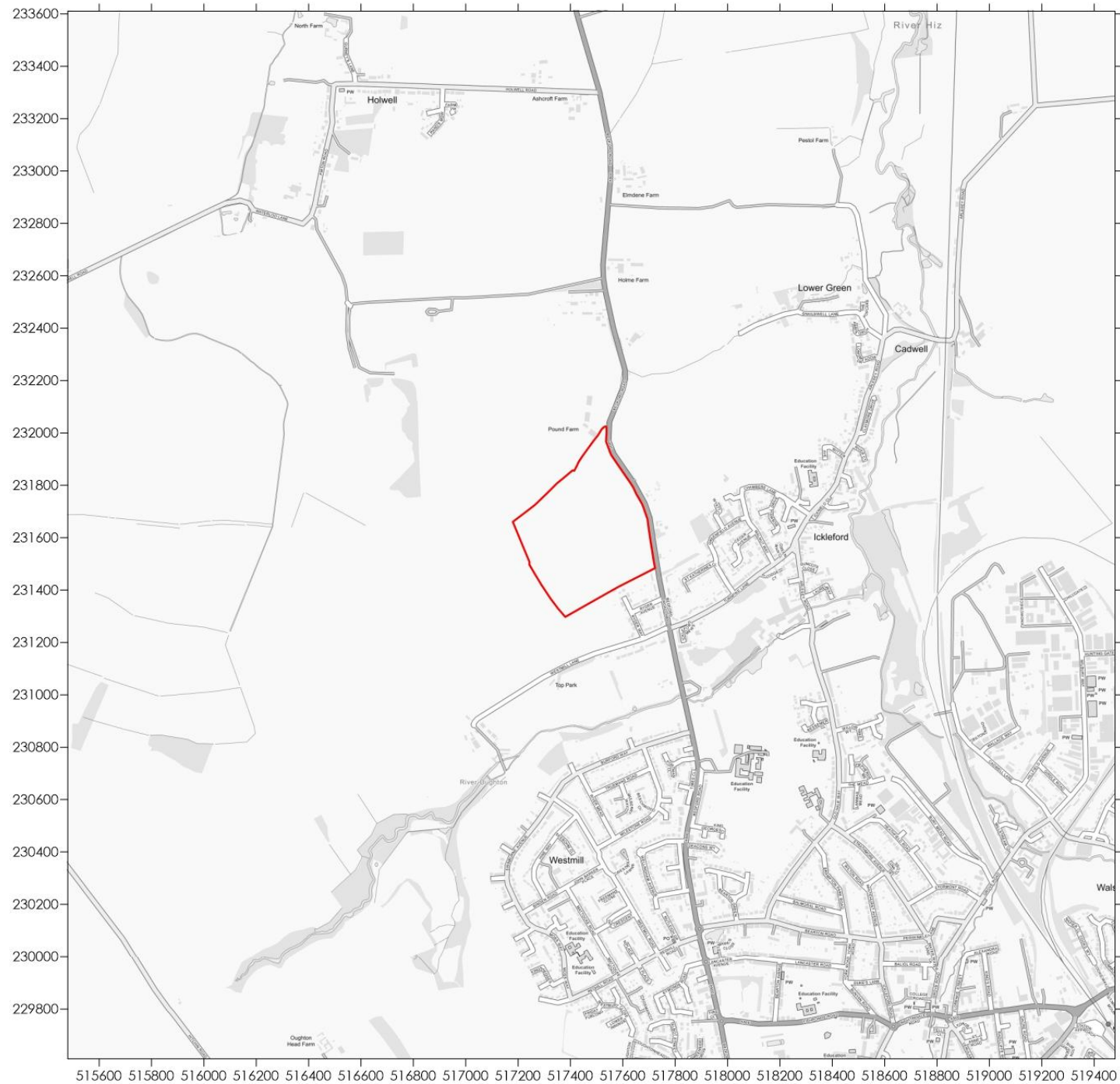
- 8.1.1 Redmore Environmental Ltd was commissioned by KP Monitoring Ltd on behalf of Bugler Homes Ltd to undertake an Air Quality Assessment in support of a residential-led mixed-use development on Land at Pound Farm, Ickleford, SG5 3RS.
- 8.1.2 The proposals have the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future residents to any existing air quality issues at the site. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider location suitability for the proposed end-use and assess potential effects as a result of the scheme.
- 8.1.3 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**.
- 8.1.4 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.
- 8.1.5 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.
- 8.1.6 The results of the dispersion modelling assessment also indicated that predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were below the relevant AQOs and Concentration Target across the development. The site is therefore considered suitable for the proposed use from an air quality perspective.

- 8.1.7 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.
- 8.1.8 A number of mitigation measures were identified in line with the requirements of the NHDC Air Quality Planning Guidance Document in order to reduce vehicle exhaust emissions associated with the proposals. It is considered these are appropriate for a development of this scale and nature and will further control impacts during the operational phase.
- 8.1.9 Based on the assessment results, air quality factors are not considered a constraint to the development.

9.0 **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
ASHP	Air Source Heat Pump
ASR	Annual Status Report
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DM	Do-Minimum
DS	Do-Something
EFT	Emissions Factor Toolkit
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
ISS	Independent Special School
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 Practice 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
SuDS	Sustainable Drainage System
Z ₀	Roughness length

Figures



Legend



Site Boundary

Title

Figure 1 - Site Location

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

10166 / KPM 31355

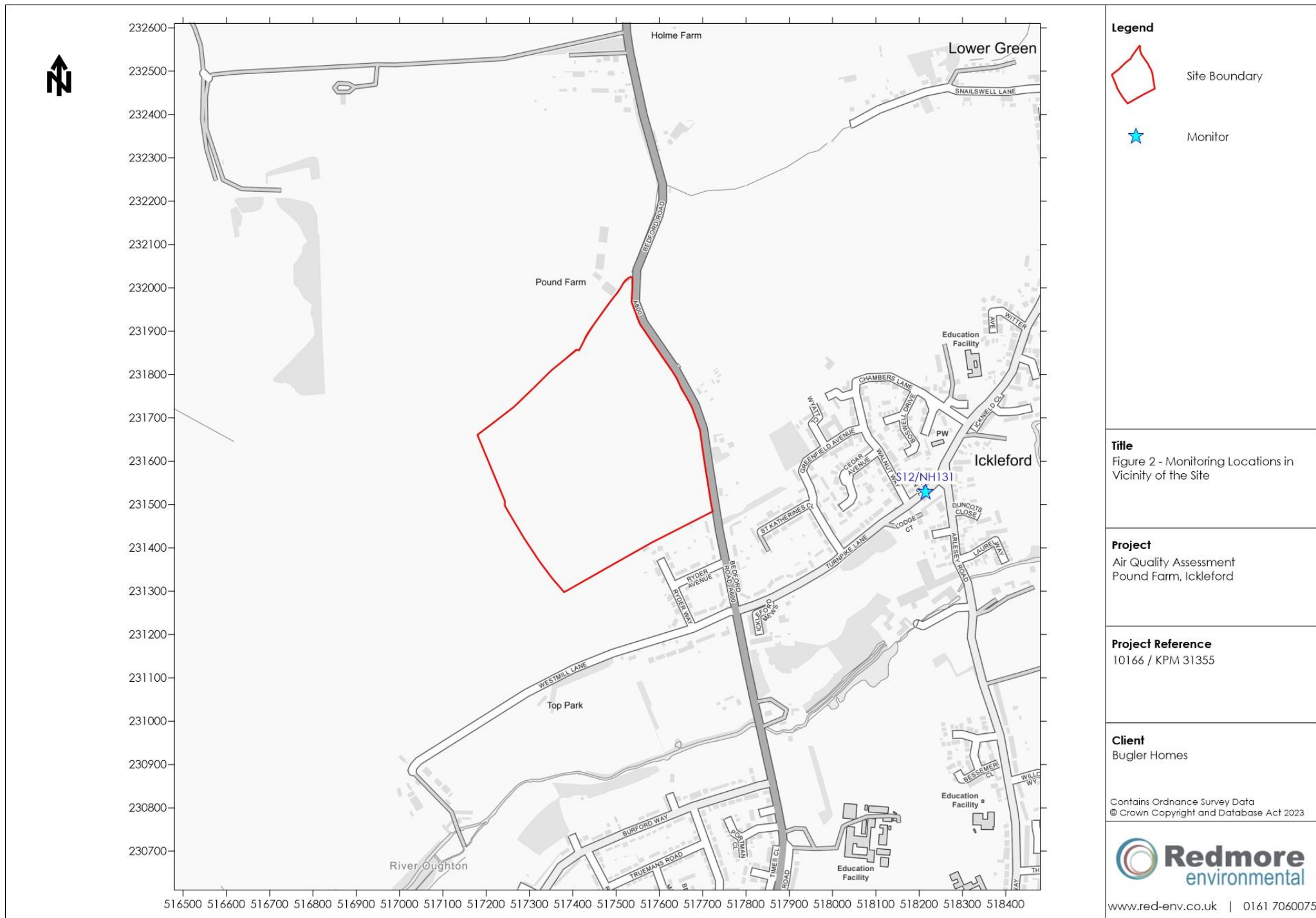
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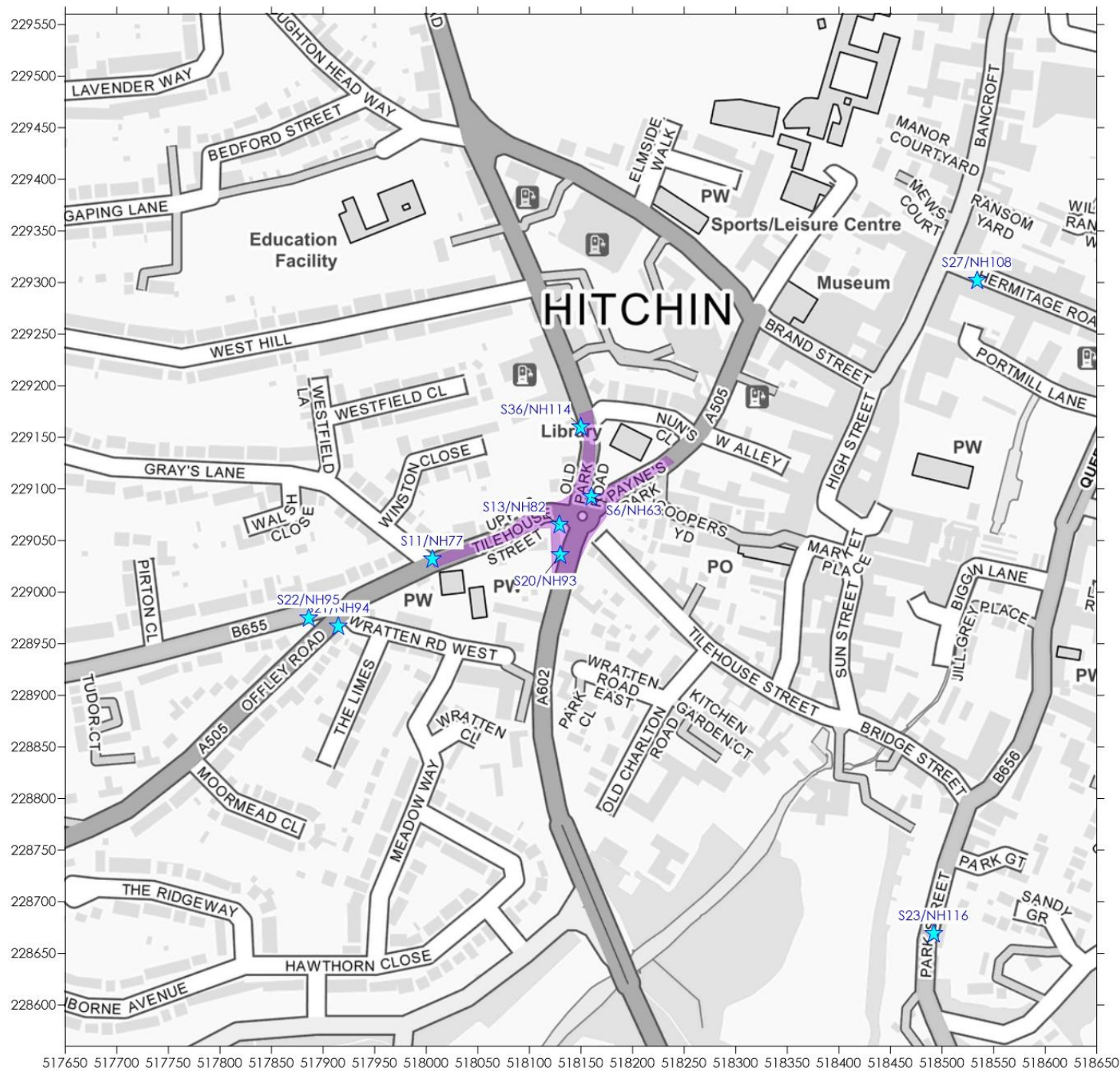
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Legend



AQMA



Monitor

Title

Figure 3 - Monitoring Locations in Vicinity of Payne's Park AQMA

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Air Quality Assessment
Pound Farm, Ickleford

Project Reference

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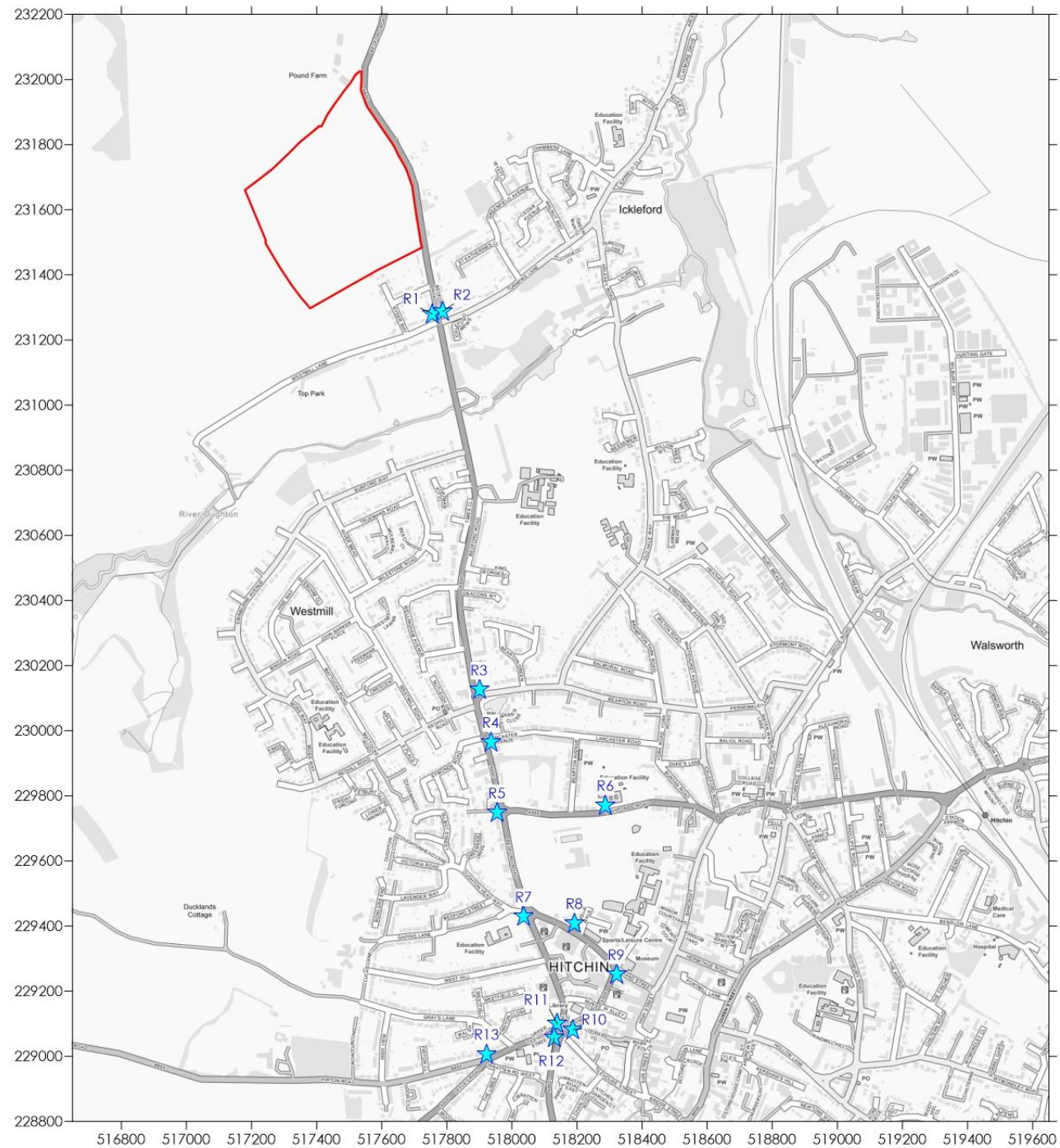
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Legend

-  Site Boundary
-  Receptor

Title

Figure 4 - Operational Phase Road
Vehicle Exhaust Emissions Sensitive
Receptors

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

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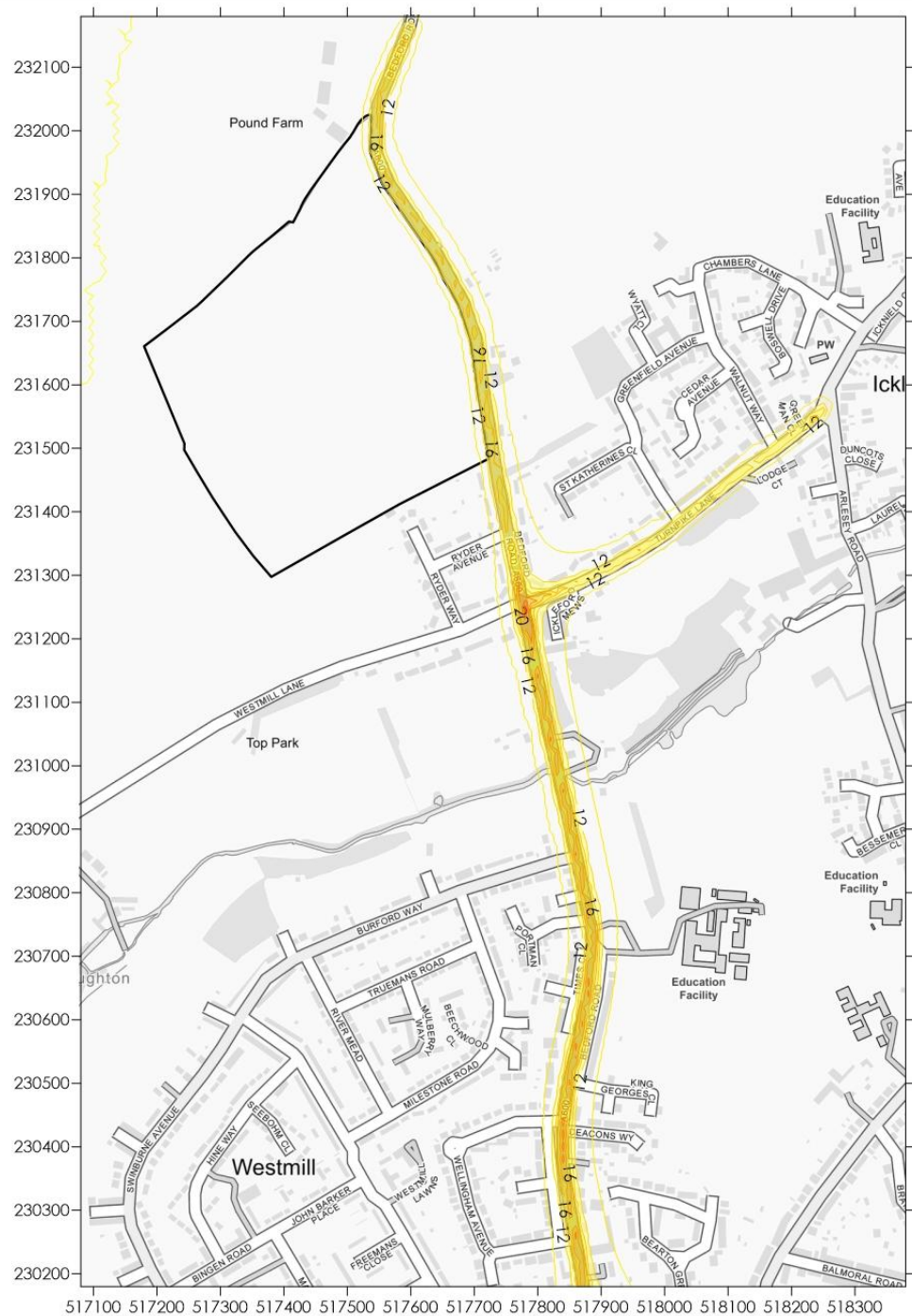
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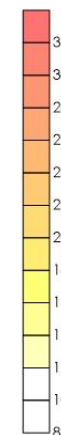
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Legend



Site Boundary



Annual Mean
NO₂ Concentration
(µg/m³)

Title

Figure 5 - Predicted Annual Mean
NO₂ Concentration (µg/m³)
Do-Minimum (Site)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

10166 / KPM 31355

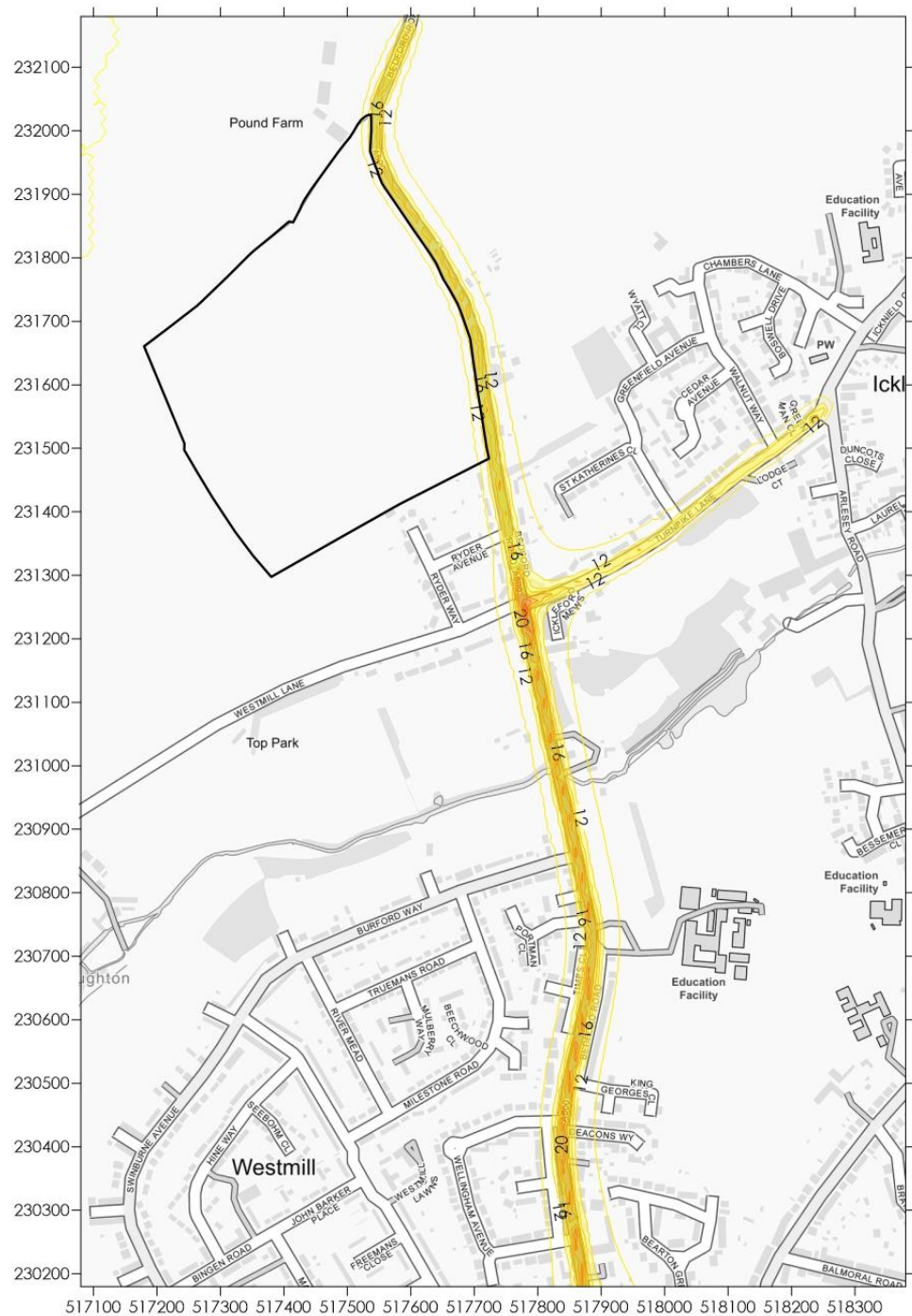
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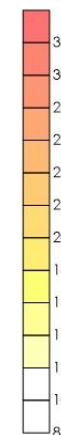
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Legend



Site Boundary



Annual Mean
NO₂ Concentration
(µg/m³)

Title

Figure 6 - Predicted Annual Mean
NO₂ Concentration (µg/m³)
Do-Something (Site)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

10166 / KPM 31355

Client

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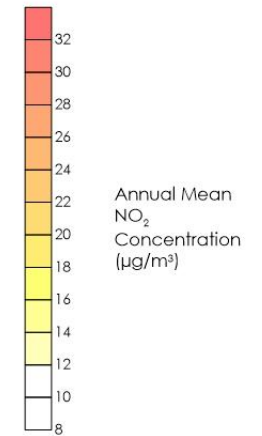
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Title

Figure 7 - Predicted Annual Mean
NO₂ Concentration (µg/m³)
Do-Minimum (AQMA)

Project

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Pound Farm, Ickleford

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Annual Mean
NO₂
Concentration
(µg/m³)

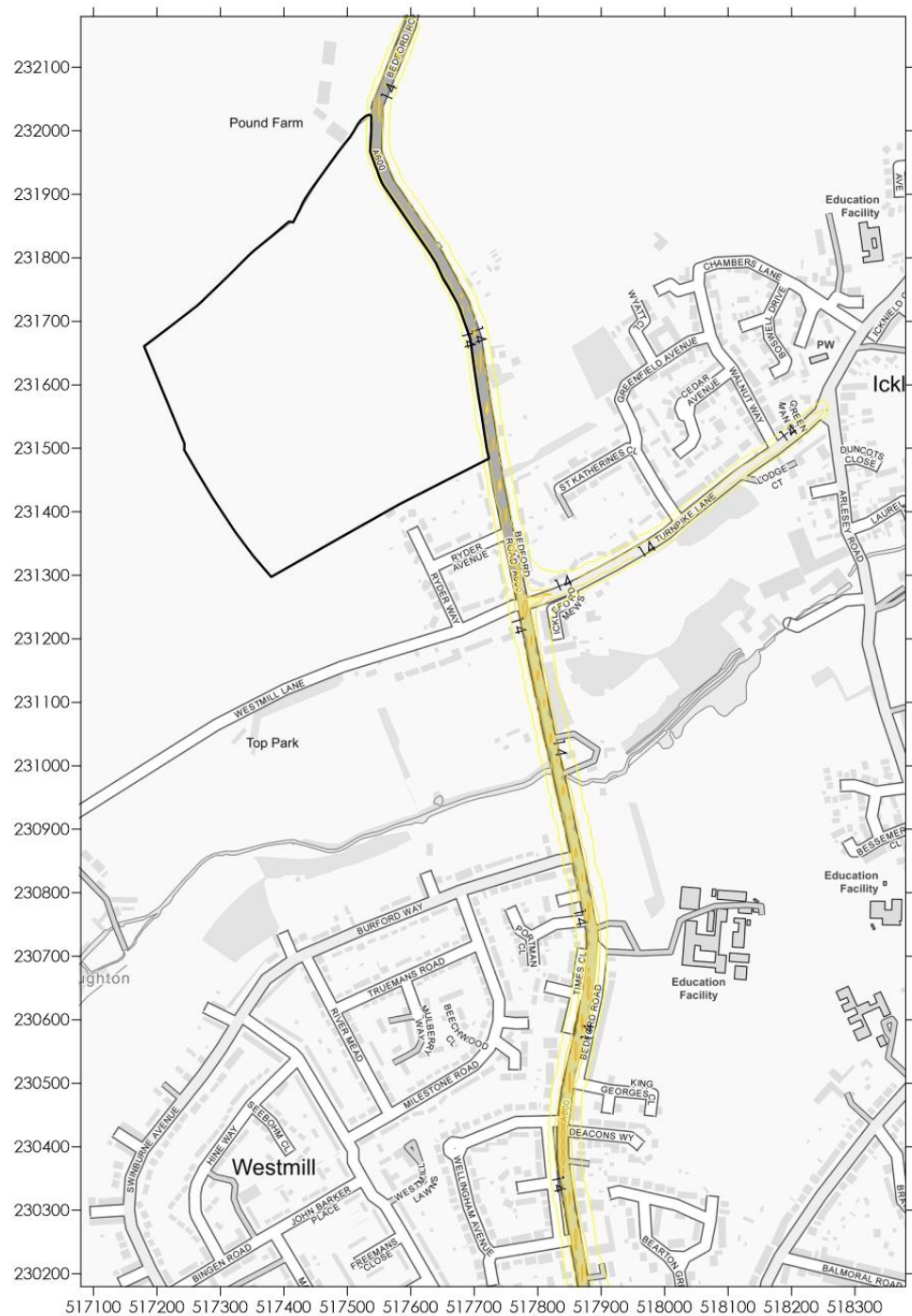
Figure 8 - Predicted Annual Mean NO₂ Concentration (µg/m³) Do-Something (AQMA)

Air Quality Assessment
Pound Farm, Ickleford

10166 / KPM 31355

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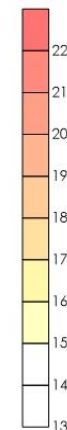




Legend



Site Boundary



Annual Mean PM₁₀
Concentration (µg/m³)

Title

Figure 9 - Predicted Annual Mean
PM₁₀ Concentration (µg/m³)
Do-Minimum (Site)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

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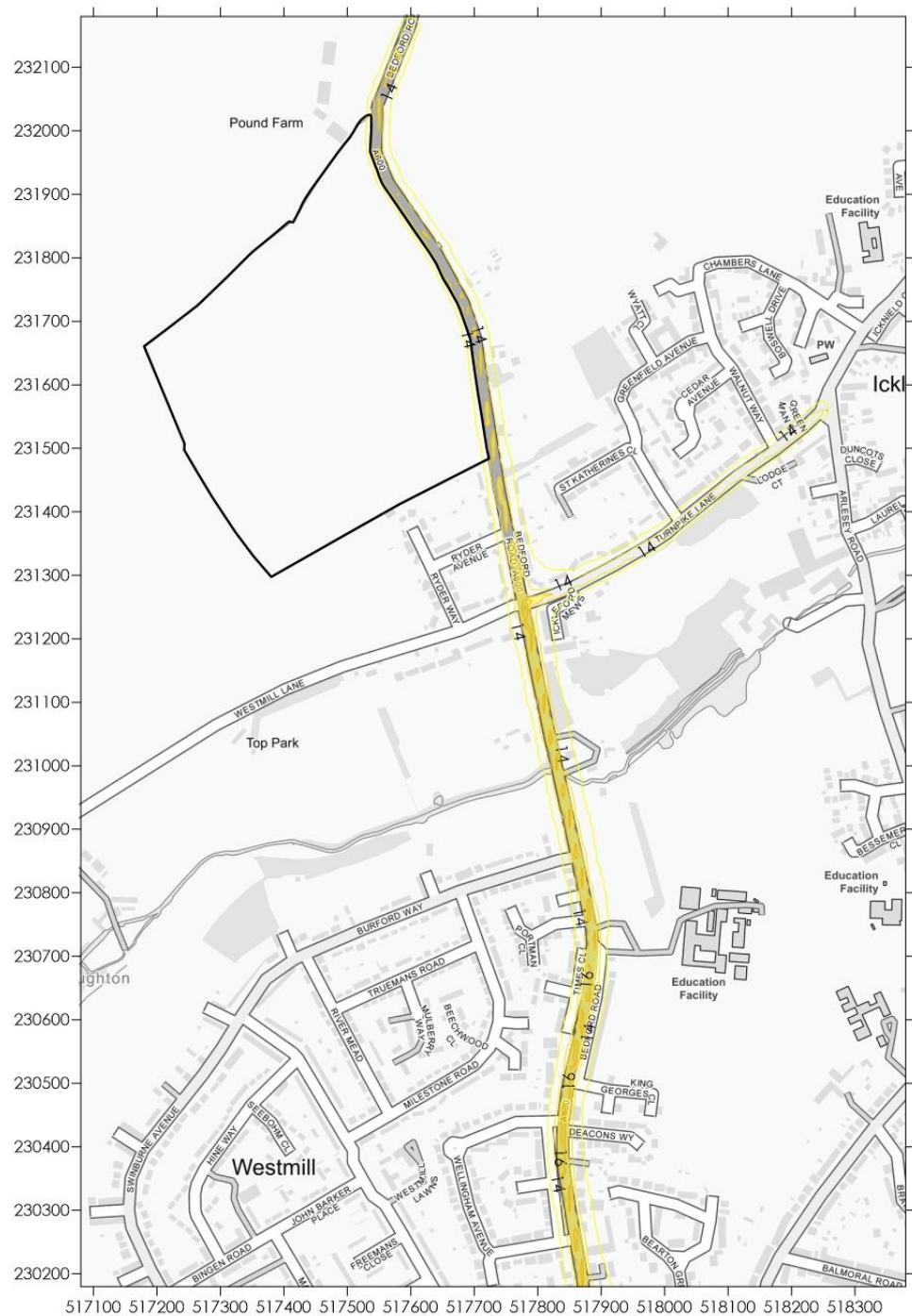
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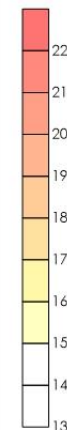
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Legend



Site Boundary



Annual Mean PM₁₀
Concentration (µg/m³)

Title

Figure 10 - Predicted Annual Mean
PM₁₀ Concentration (µg/m³)
Do-Something (Site)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

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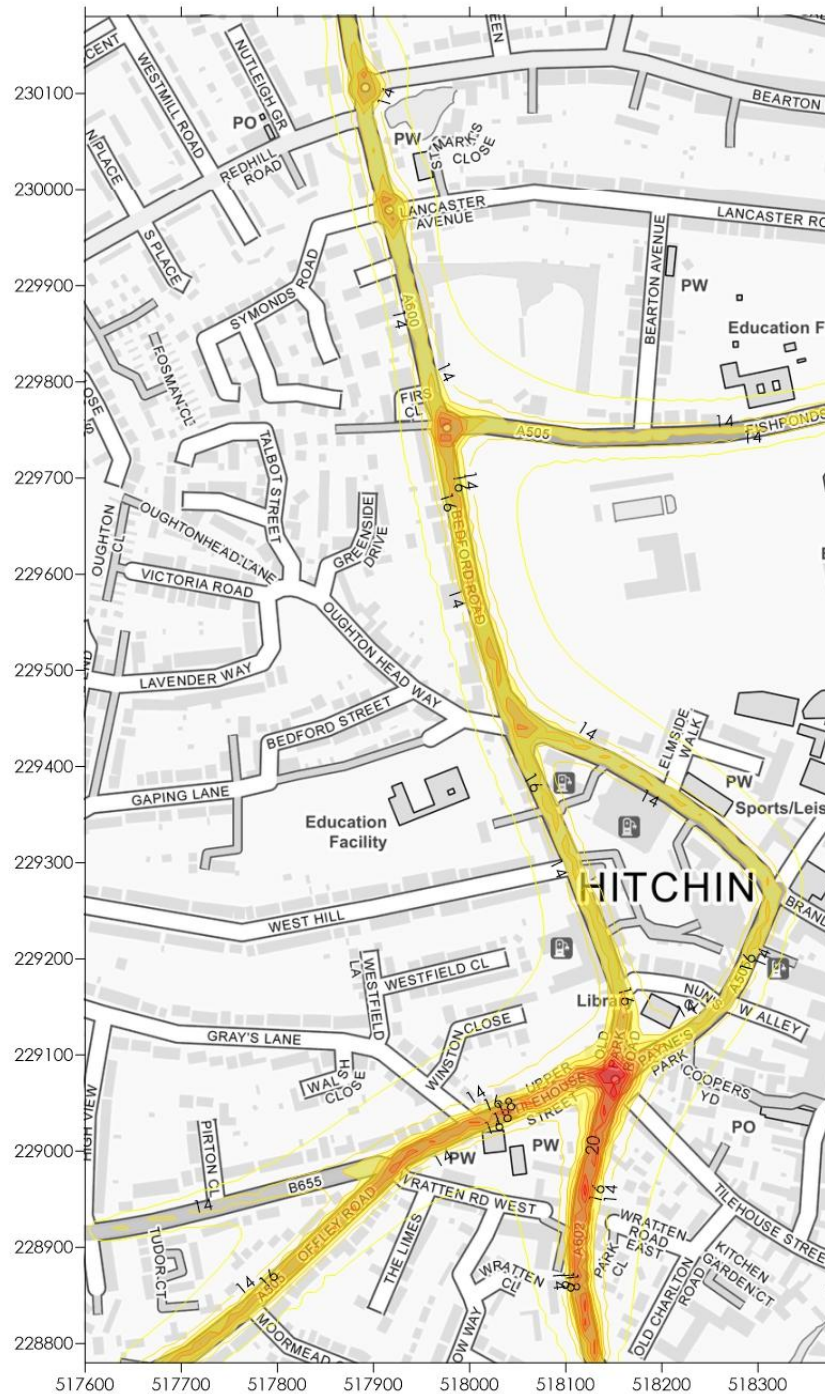
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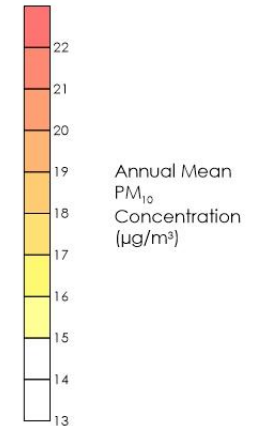
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Title

Figure 11 - Predicted Annual Mean
PM₁₀ Concentration (µg/m³)
Do-Minimum (AQMA)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

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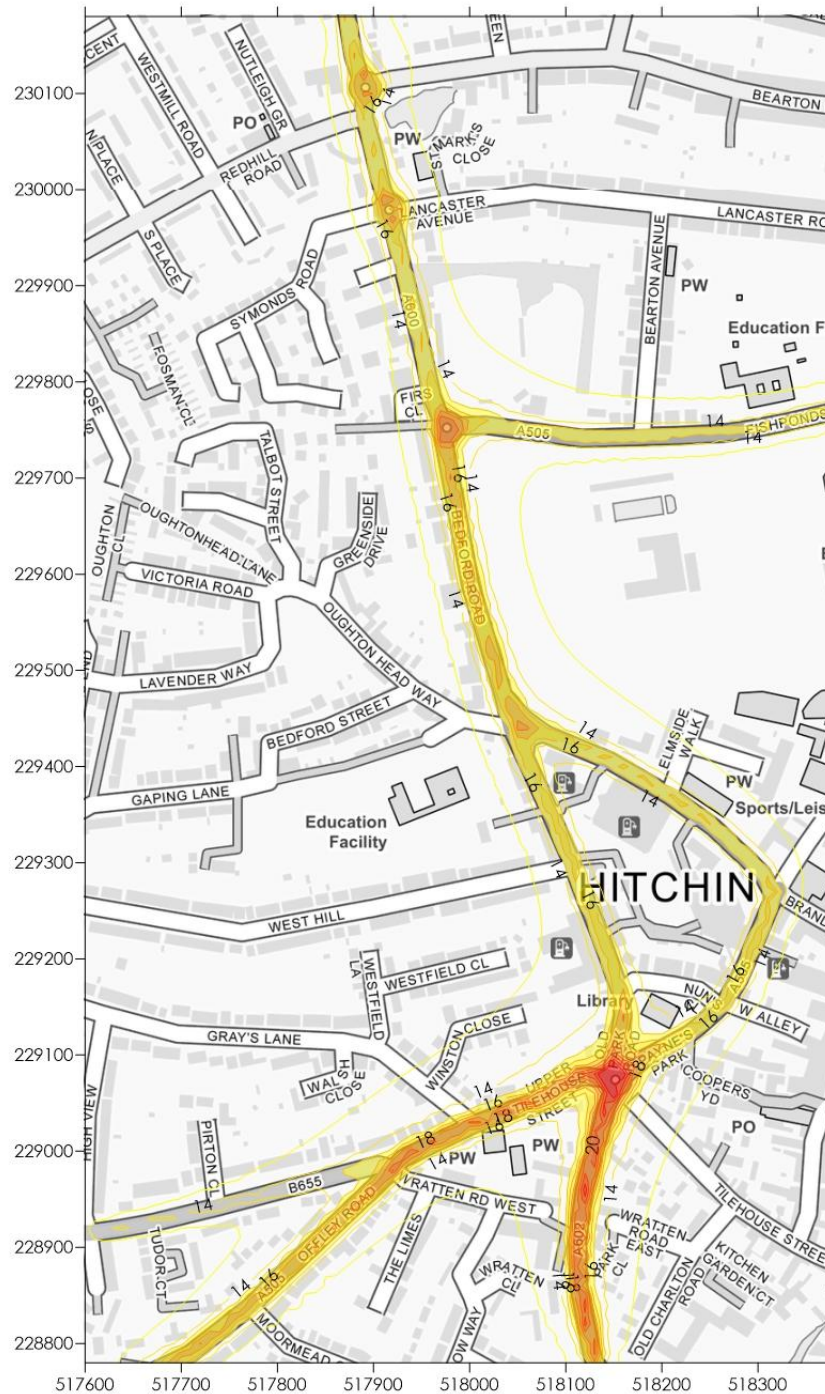
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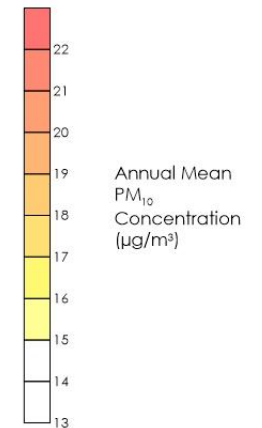
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Title

Figure 12 - Predicted Annual Mean PM₁₀ Concentration (µg/m³)
Do-Something (AQMA)

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Pound Farm, Ickleford

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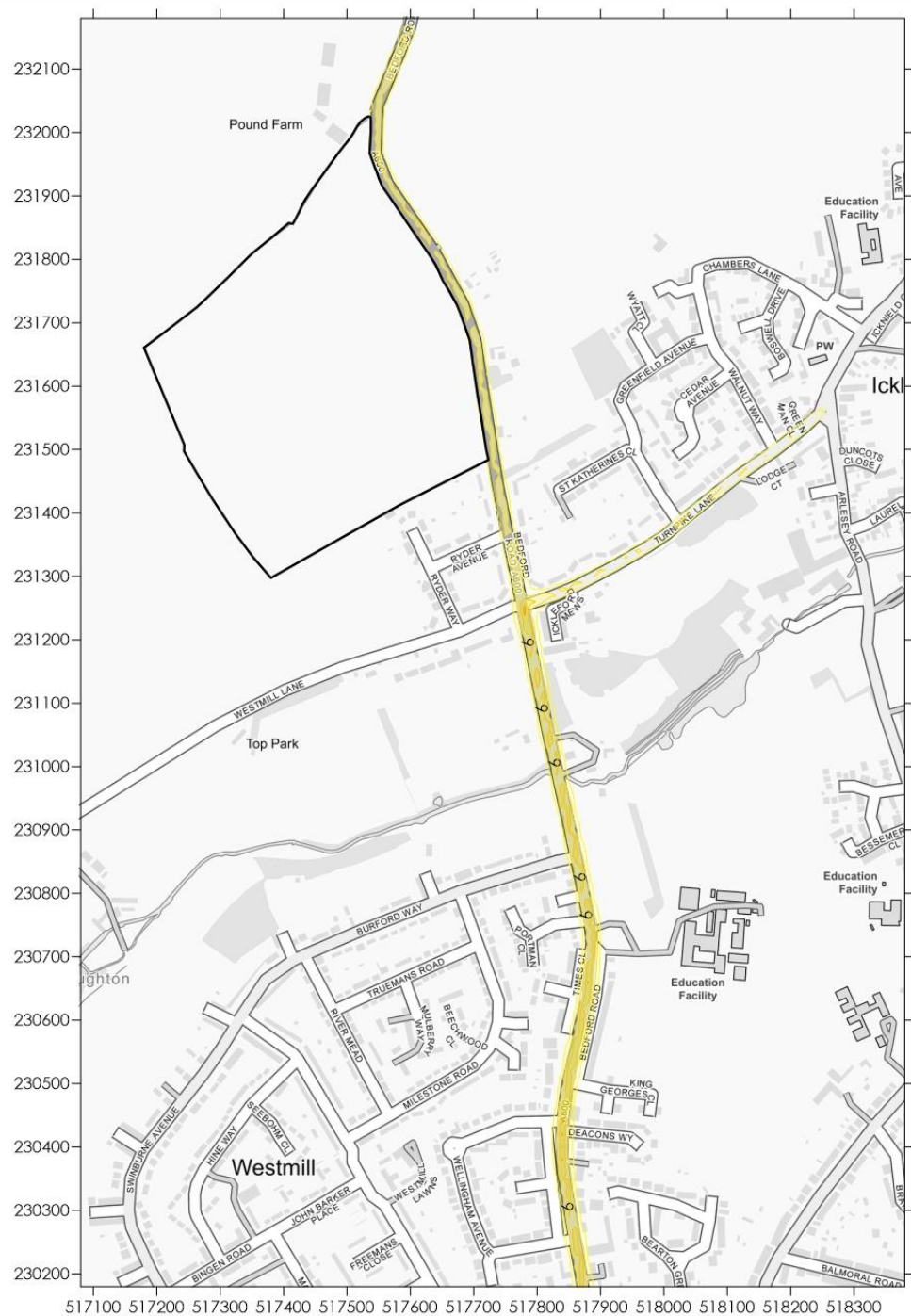
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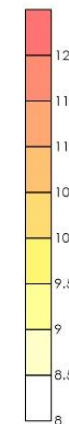
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Legend



Site Boundary



Annual Mean PM_{2.5}
Concentration
(µg/m³)

Title

Figure 13 - Predicted Annual Mean
PM_{2.5} Concentration (µg/m³)
Do-Minimum (Site)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

10166 / KPM 31355

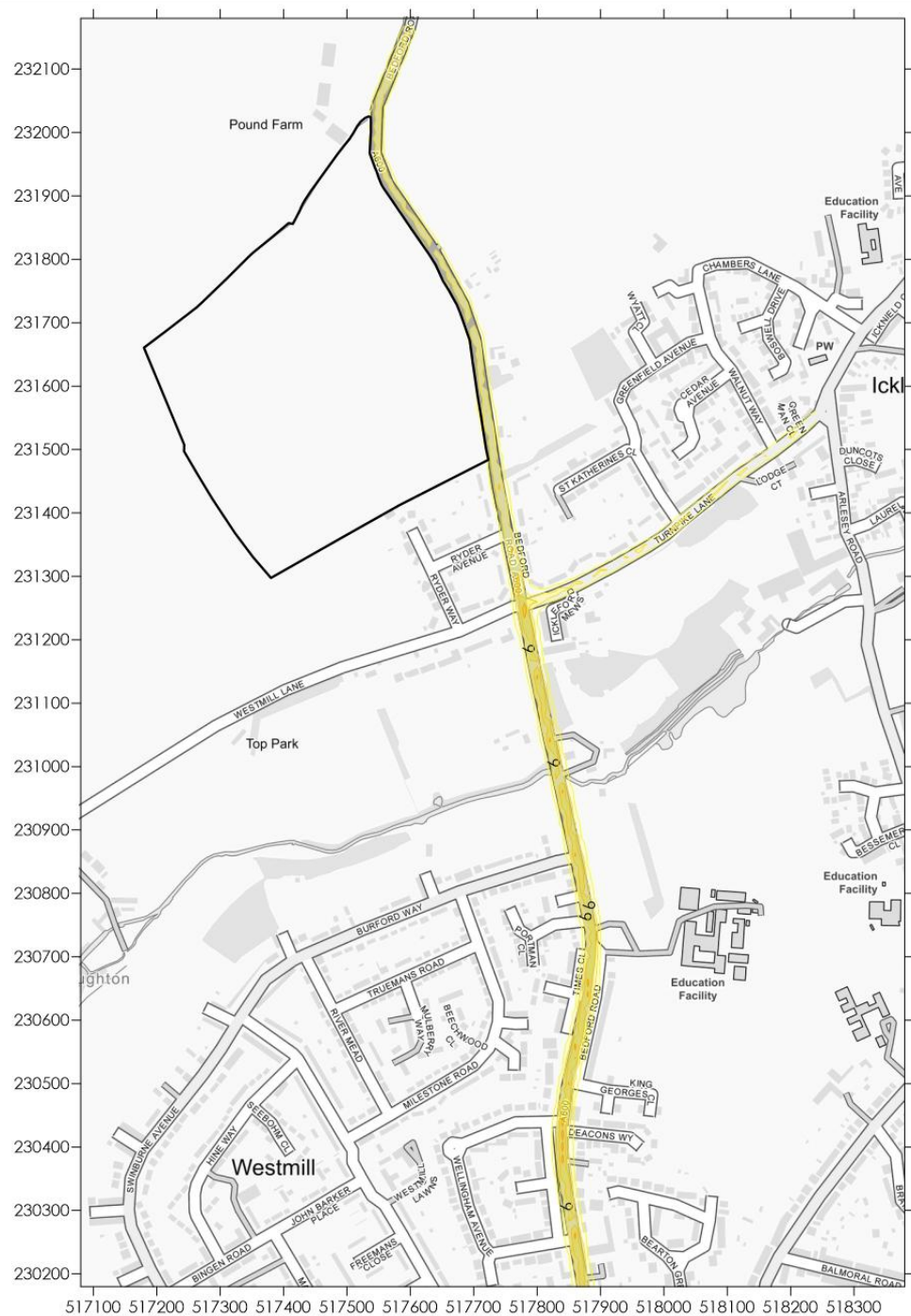
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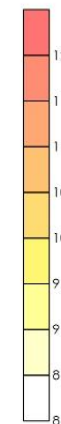
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Legend



Site Boundary



Annual Mean PM_{2.5}
Concentration
(µg/m³)

Title

Figure 14 - Predicted Annual Mean
PM_{2.5} Concentration (µg/m³)
Do-Something (Site)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

10166 / KPM 31355

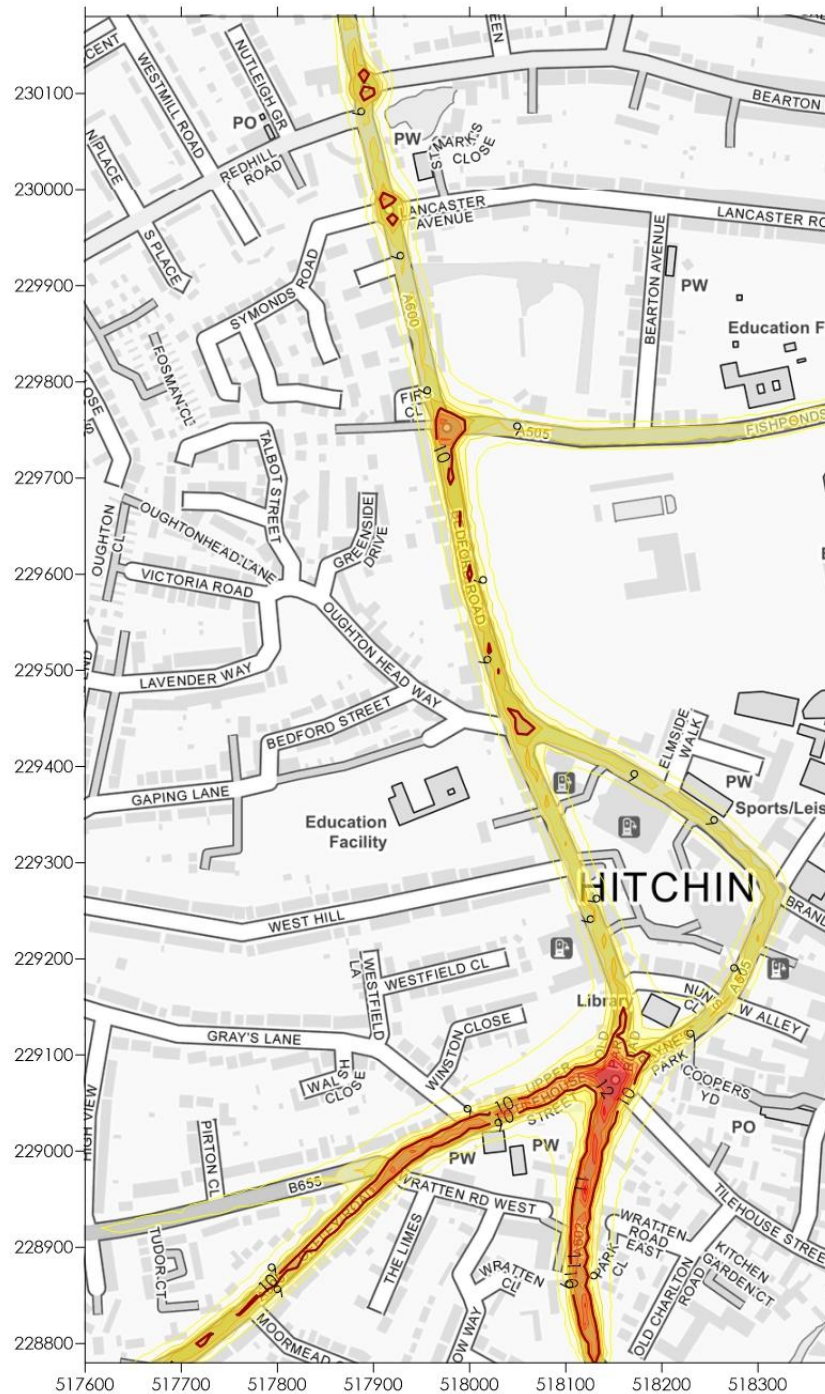
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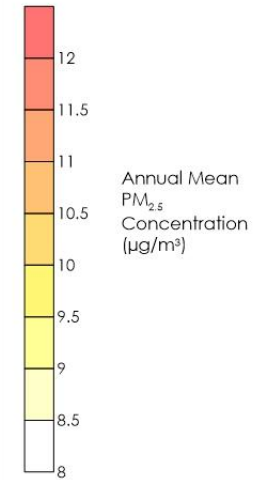
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Title

Figure 15 - Predicted Annual Mean PM_{2.5} Concentration (µg/m³) Do-Minimum (AQMA)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

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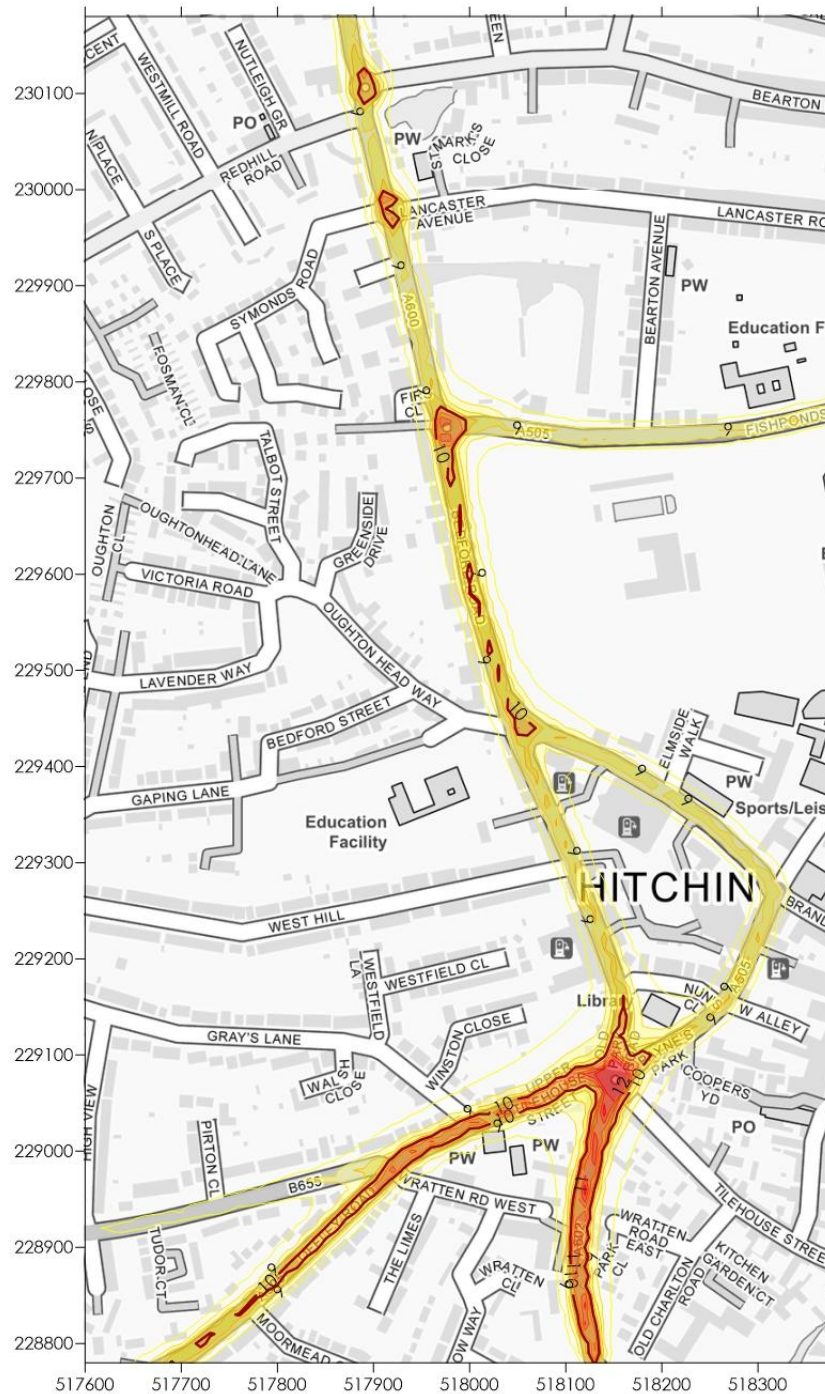
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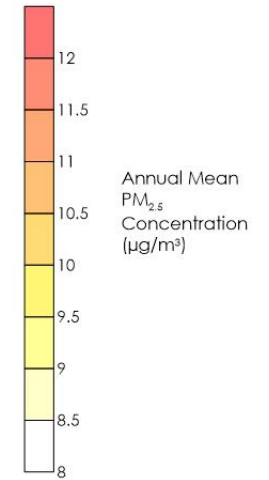
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Title

Figure 16 - Predicted Annual Mean PM_{2.5} Concentration (µg/m³)
Do-Something (AQMA)

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

10166 / KPM 31355

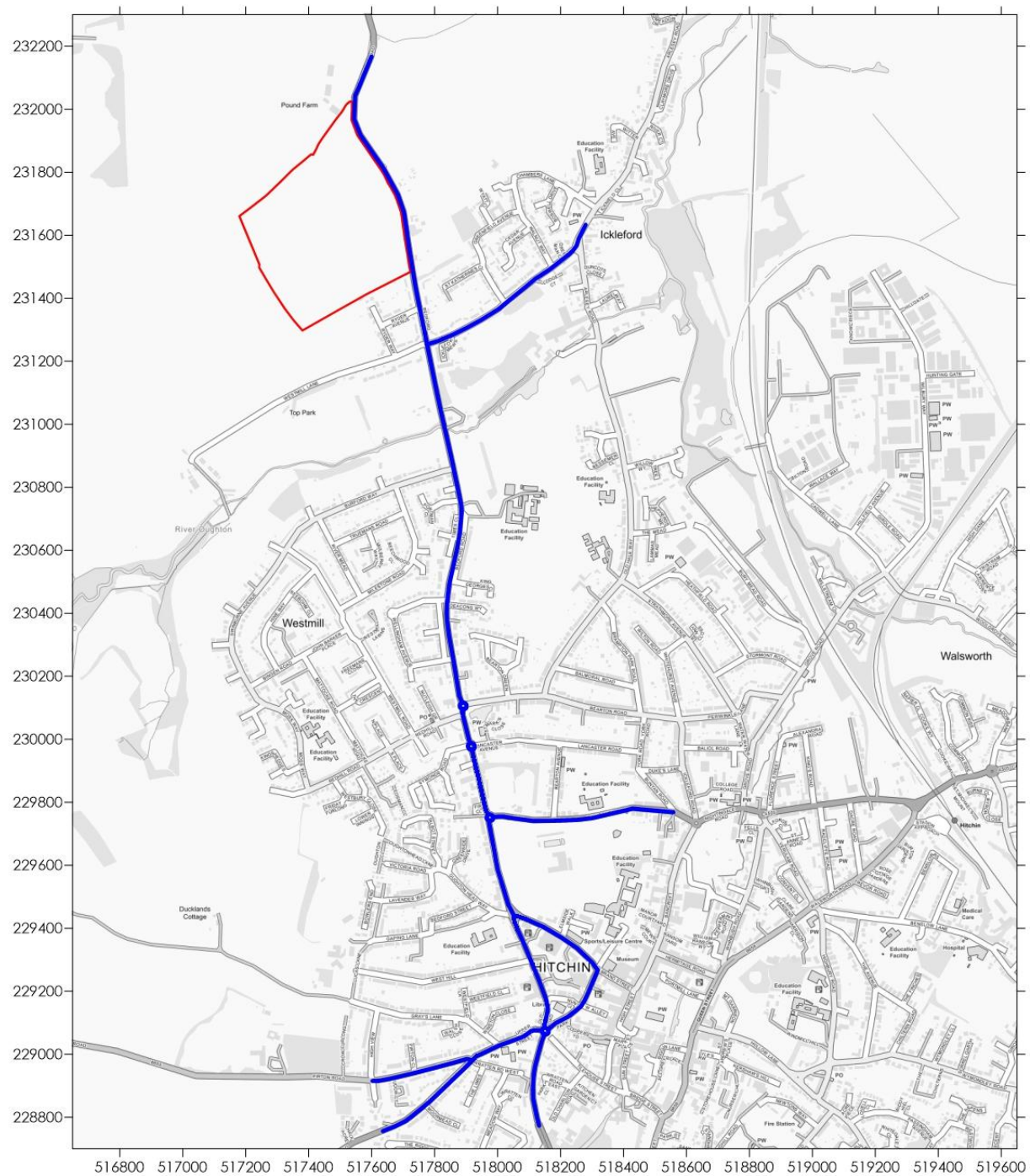
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-  Site Boundary
-  Road Link

Title

Figure 17 - ADMS-Roads Inputs

Project

Air Quality Assessment
Pound Farm, Ickleford

Project Reference

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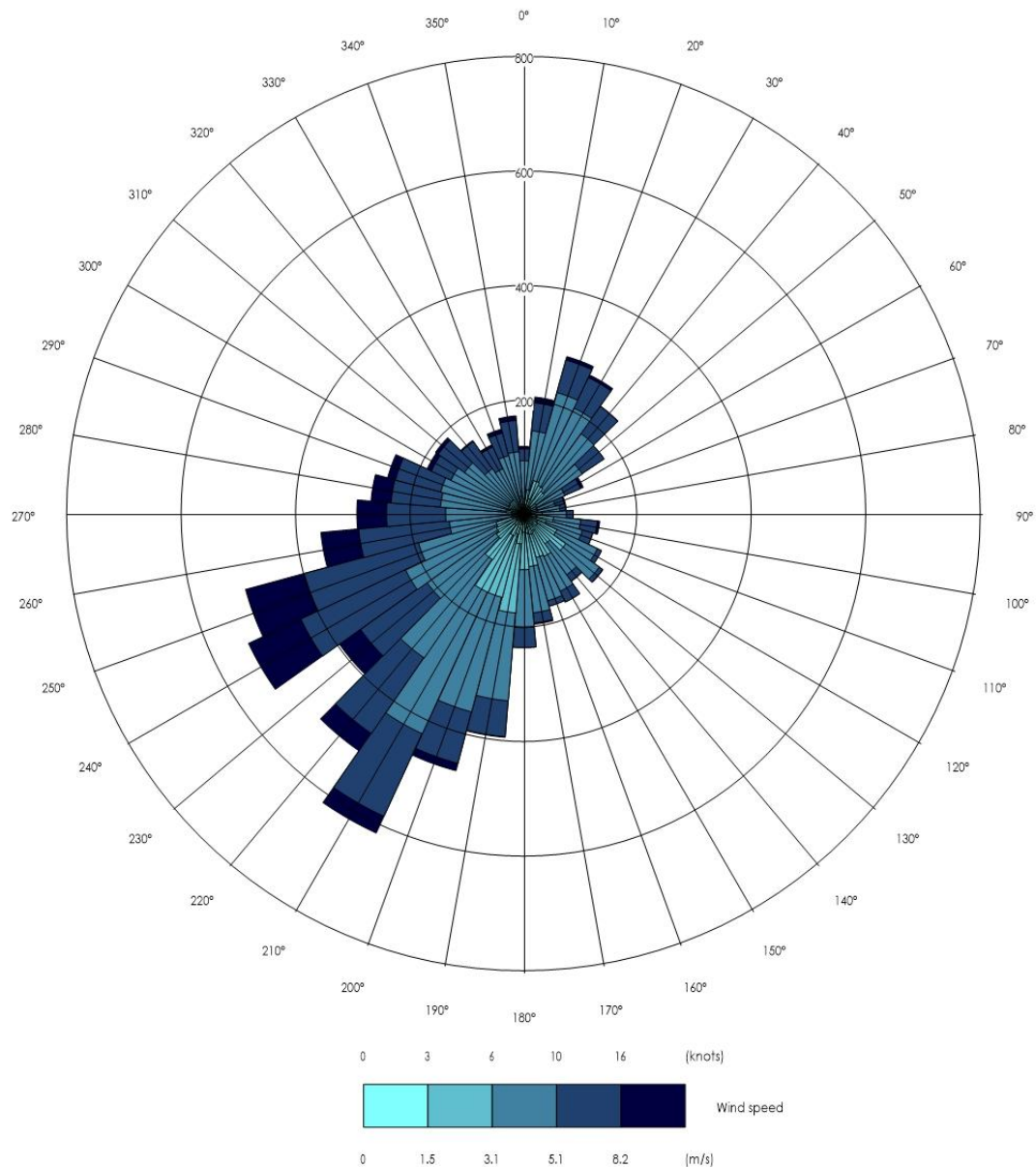
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Title

Figure 18 - Wind Rose of 2023
Luton Airport Meteorological
Data

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Appendix 1 - Assessment Input Data

Introduction

The proposals have the potential to cause air quality impacts as a result of exhaust emissions associated with vehicles travelling to and from the development, as well as expose future residents to any existing air quality issues at 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: 517080, 228780 to 518380, 232180. 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 17 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)²⁶. 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 guidance²⁷ 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;

²⁶ <https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints>.

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

- Vehicle speeds specific to slow phases were determined using the methodology outlined in the DEFRA guidance²⁸;
- 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 guidance²⁹, 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.	20230 DM	2030 DS			
L1	Bedford Road north of development	9,443	9,820	10,085	3.72	45	7.7
L2	Bedford Road south of development	9,443	9,820	10,817	3.72	45	7.5
L3	Bedford Road north of Turnpike Lane Slow Phase (SP)	9,443	9,820	10,817	3.72	20	7.5
L4	Turnpike Lane SP	7,676	8,501	8,627	0.73	20	6.8
L5	Turnpike Lane	7,676	8,501	8,627	0.73	45	6.0
L6	Bedford Road south of Turnpike Lane SP	12,498	13,183	14,053	2.46	20	8.5
L7	Bedford Road - Turnpike Lane to Bearton Road	12,498	13,364	14,234	2.46	45	7.2
L8	Bedford Road north of Bearton Road SP	12,498	13,364	14,234	2.46	20	10.2
L9	Bedford Road south of Bearton Road SP	12,498	13,364	14,234	2.46	20	13.3
L10	Bedford Road - Bearton Road to Lancaster Avenue	12,498	13,364	14,234	2.46	45	10.9
L11	Bedford Road north of Lancaster Avenue SP	12,498	13,364	14,234	2.46	20	11.7
L12	Bedford Road south of Lancaster Avenue SP	12,498	13,364	14,234	2.46	20	10.4

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

²⁹ 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.	20230 DM	2030 DS			
L13	Bedford Road - Lancaster Avenue to Fishponds Road	12,498	13,364	14,234	2.46	45	10.2
L14	Bedford Road north of Fishponds Road SP	12,498	13,364	14,234	2.46	20	10.6
L15	Fishponds Road SP	11,502	12,074	12,364	1.39	20	12.4
L16	Fishponds Road	11,502	12,074	12,364	1.39	45	7.5
L17	Bedford Road south of Fishponds Road SP	17,917	18,979	19,560	2.80	20	10.4
L18	Bedford Road - Fishponds Road to Oughton Head Way	17,917	18,979	19,560	2.80	45	9.2
L19	Bedford Road north of Oughton Head Way SP	17,917	18,979	19,560	2.80	20	12.5
L20	Bedford Road one-way southbound (SB) SP	12,275	12,965	13,255	3.27	20	10.1
L21	Bedford Road north of Payne's Park	12,275	12,965	13,255	3.27	45	7.7
L22	Payne's Park one-way	12,275	12,965	13,255	3.27	45	7.0
L23	Payne's Park SP	12,275	12,965	13,255	3.27	20	9.0
L24	Old Park Road SP	13,214	13,939	14,229	3.47	20	8.5
L25	Old Park Road one-way	13,214	13,939	14,229	3.47	45	7.5
L26	Old Park Road to Bedford Road SP	13,214	13,939	14,229	3.47	20	10.2
L27	Upper Tilehouse Street west of Old Park Road SP	21,177	22,082	22,372	3.52	20	10.3
L28	Upper Tilehouse Street SP	21,177	22,082	22,372	3.52	20	7.0
L29	Upper Tilehouse Street east of Offley Road SP	21,177	22,082	22,372	3.52	20	8.4
L30	Pirton Road SP	6,316	6,545	6,545	1.32	20	7.7
L31	Pirton Road	6,316	6,545	6,545	1.32	45	7.0
L32	Offley Road SP	17,906	18,692	18,982	4.96	20	8.5
L33	Offley Road	17,906	18,692	18,982	4.96	45	8.3
L34	Park Way SP	27,627	28,814	29,104	3.00	20	12.2
L35	Park Way	27,627	28,814	29,104	3.00	45	7.5

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Avg. Vehicle Speed (km/h)	Road Width (m)
		Verif.	20230 DM	2030 DS			
L36	Turnpike Lane west of Arlesley Road SP	7,676	8,501	8,627	0.73	20	6.6
L37	Payne Park Roundabout	18,573	19,568	20,149	3.28	20	11.2
L38	Fishponds Road Roundabout	13,972	14,892	15,472	2.14	20	7.5
L39	Bearton Road Roundabout	12,498	13,364	14,234	2.46	20	8.5
L40	Lancaster Avenue Roundabout	12,498	13,364	14,234	2.46	20	8.5

Reference should be made to Figure 17 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.

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 11.4km 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 18 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 10m was used to describe the modelling extents. This is considered appropriate for the site and is suggested within ADMS-Roads as being suitable for 'small towns <50,000'.

A minimum Monin-Obukhov length of 30m was used to describe the meteorological site. This is considered appropriate for the area of the station 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 NGR: 518500, 229500, which contains the monitors in the vicinity of the Payne's Park AQMA, as shown in Figure 3. These are shown in Table A1.2.

Table A1.2 Background Pollutant Concentrations - Modelling Extents

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)	
	2023	2030
NO ₂	10.10	7.86
PM ₁₀	12.81	12.10
PM _{2.5}	7.78	7.15

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 11. Background PM₁₀ and PM_{2.5} values were chosen to provide continuity throughout the assessment.

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 guidance³⁰.

Verification

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

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of the assessment, model verification was undertaken for 2023 using traffic data, meteorological data and monitoring results from this year.

Monitoring of NO₂ concentration was undertaken at eight 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 guidance³¹. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A1.3.

³⁰ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

³¹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table A1.3 NO_x Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
S21/NH94	Offley Road, Hitchin	18.6	18.62
S22/NH95	Pirton Road, Hitchin	20.7	23.63
S11/NH77	Upper Tilehouse Street, Hitchin (traffic lights)	27.2	40.41
S20/NH93	Park Way, Hitchin	26.9	39.59
S13/NH82	Upper Tilehouse Street, Nr Roundabout	22.7	28.58
S6/NH63	Library, Hitchin	24.5	33.19
S36/NH114	Old Park Road, Hitchin	20.7	23.63
S12/NH131	Turnpike Lane, Ickleford	15.4	11.32

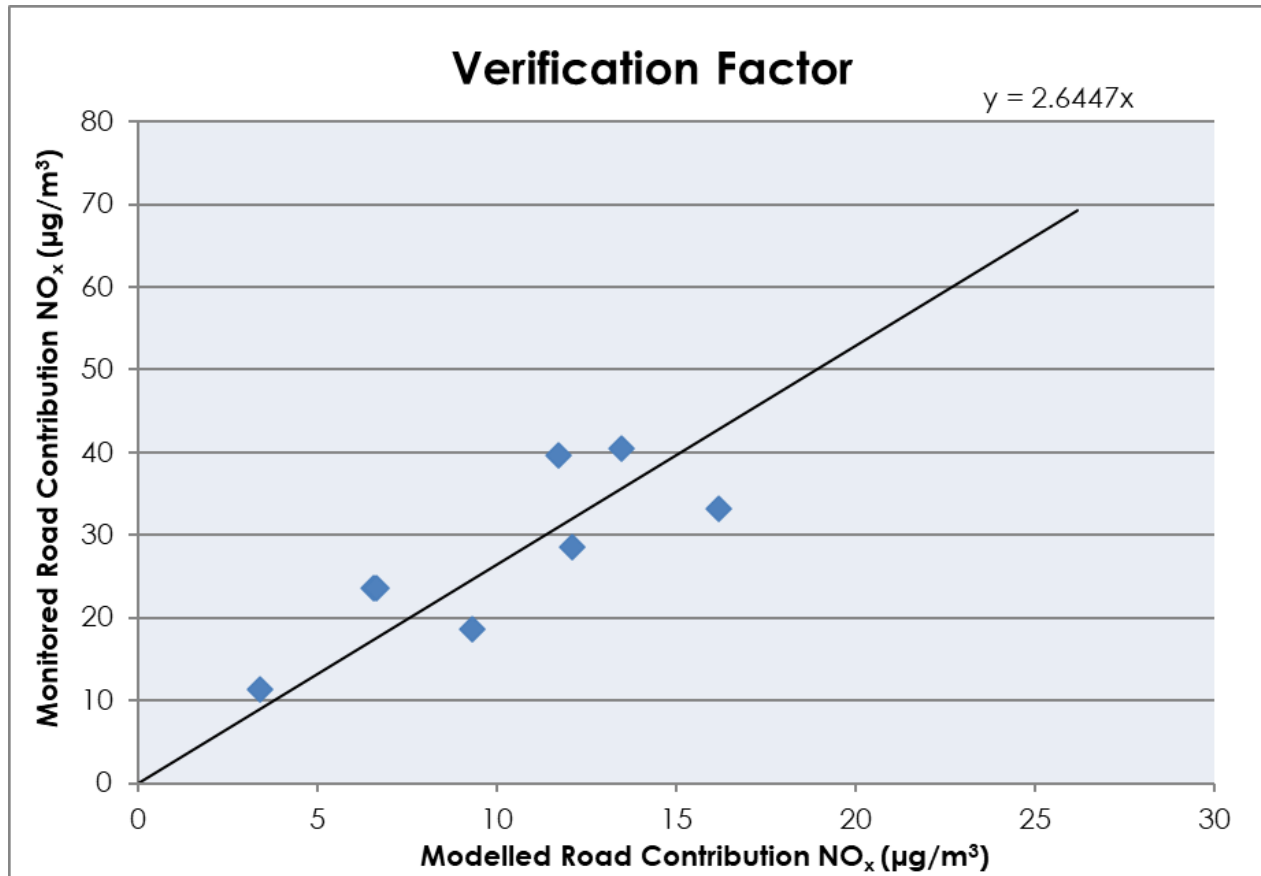
The annual mean road NO_x concentrations predicted from the dispersion model and the 2023 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.4.

Table A1.4 NO_x Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
S21/NH94	Offley Road, Hitchin	18.62	9.32
S22/NH95	Pirton Road, Hitchin	23.63	6.57
S11/NH77	Upper Tilehouse Street, Hitchin (traffic lights)	40.41	13.50
S20/NH93	Park Way, Hitchin	39.59	11.74
S13/NH82	Upper Tilehouse Street, Nr Roundabout	28.58	12.10
S6/NH63	Library, Hitchin	33.19	16.18
S36/NH114	Old Park Road, Hitchin	23.63	6.66
S12/NH131	Turnpike Lane, Ickleford	11.32	3.40

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 2.6447 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



Monitoring of PM₁₀ and PM_{2.5} concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust model predictions of these species in lieu of more accurate data in accordance with DEFRA guidance³².

³² Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Appendix 2 - Curricula Vitae

KEY EXPERIENCE:

Claire is a Director with specialist experience in the air quality sector. Her key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide range of clients from the residential, retail, commercial, leisure and industrial and infrastructure sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-6 and AERMOD. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Assessment of fugitive dust impacts from a range of waste and industrial developments.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Undertaken and overseeing pollutant monitoring campaigns.
- Provision of expert advice and attendance at DCO examination process.

SELECT PROJECTS SUMMARY:**Residential and Educational**

Air Quality Assessments for a large number of proposed residential and educational developments across the UK. The assessments included consideration of construction phase dust emissions and mitigation was recommended to minimise fugitive dust emissions accordingly. The suitability of the sites for the proposed residential and educational uses was also assessed. The assessment utilised a range of assessment tools including relevant screening criteria, air dispersion modelling using ADMS-Roads, local air quality monitoring and Defra published assessment tools. Where required for sites in London, Air Quality Neutral assessments were also undertaken utilised the Greater London Authority guidance.

Air Quality Monitoring

Air Quality Assessments and overseeing air quality monitoring campaigns for a number of sites within Birmingham. Air dispersion modelling was undertaken and air quality monitoring utilising NO₂ diffusion tubes was carried out for use in verification of the dispersion model. Mitigation was recommended where appropriate to reduced the exposure of future uses of the sites to elevated pollutant concentrations.

Odour Assessments

Undertaken to support developments in the UK, including consideration of the impact of existing odour sources on proposed developments or to assess proposed odour releases. A combination of field odour surveys, risk assessments and detailed dispersion modelling were undertaken, with mitigation measures recommended where required.

Commercial and Retail

Foodstores across the UK - Air quality assessments for a number of proposed foodstores across the UK. Consideration was given to construction phase dust emissions and vehicle emissions generated by the foodstore operations. Relevant screening criteria and detailed air dispersion modelling were utilised in the assessment. Mitigation was recommended as required to minimise construction phase dust emissions.

Commercial development,

Workshop - Air quality assessment and input into the EIA for a proposed large scale commercial development near Workshop. Assessments of construction phase dust and operational phase road traffic emissions were undertaken and consideration was given to both human and ecological receptors.

Industrial and Infrastructure**Greater Manchester Waste PFI**

Contract - Air Quality and Odour Assessments were undertaken as part of the Planning Applications and Environmental Permit applications for a number of proposed waste facilities in Greater Manchester.

Energy from Waste Development,

Scotland - Air Quality Assessment and coordination of the EIA and Environmental Permit Application for a proposed Energy from Waste development in Scotland.

Considered industrial emissions from flue stacks as well as additional road traffic movements generated by the development
Strategic Rail Freight Interchange, Hinckley - oversaw the Air Quality Assessment for the proposed Rail Freight Interchange and acted as expert witness as part of the Development Consent Order (DCO) examination process.

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.